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August 2011
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On the cover . . .

The compact Kimber Solo Carry is chambered in 9mm. Photo by G. Hudson.

Page 74

Page 42

Page 66

Issue No. 273 **August 2011**

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The .44 and .38 WCFs Are Rifle Cartridges

by Dave Scovill

Back in 1873 when Winchester introduced the .44 WCF (Winchester Center Fire) in its Model 73 lever-action rifle, the cartridge itself was somewhat revolutionary. First off, it replaced the .44 Henry rimfire that, although a bit underpowered by modern standards, also represented a milestone in the Henry repeating rifle during the 1860s – 16 shots as fast you could chuck them through the action, aim and pull the trigger.

The .44 WCF was easily reloaded, assuming a supply of ball, powder and primers; and with a supply of components and/or a few pounds of lead and a bullet mould, the wandering adventurer could turn his horse into the setting sun and keep riding.

The .38 WCF was quite popular in the Colt SAA.

Winchester shipped 1.3 million .44 and .38 WCF Model 73 and 92 rifles and carbines from 1873 to the early 1940s.

The real advantage of the .44 WCF, however, was that it offered real firepower – 16 shots with a 200-grain bullet at 1,300 fps in a relatively lightweight repeating rifle. Not a buffalo rifle, for sure, but certainly capable of putting meat on the table and providing protection from a variety of threatening beasts and two-legged vermin.

By 1878 Colt adapted the .44 WCF in its soon-to-be legendary Model P (aka Single Action Army), becoming not only the first centerfire rifle cartridge to be adapted to a revolver, but also the only cartridge ever to earn recognition with a phrase, "Frontier Six Shooter." At the same time, the Model 73 was so readily identified that "Winchester" was synonymous with ".44" until the .38 WCF was introduced in 1879.

With the introduction of the Winchester Model 92, the .44 WCF continued its run into the smokeless powder era, with a combined run for the Models 73 and 92 of 1,165,176 rifles and carbines. If you toss in the .38 WCF, the numbers hit 1.3 million from 1873 to 1941 – unheard of at the time for non-military rifles and cartridges, and who knows how many were chambered in Marlins and Remingtons.

With the onset of World War II, the .44 and .38 WCFs were essen-

RCBS made this custom .38 WCF full-length sizing die several years ago. Nowadays it has a different part number and name.

tially forgotten, and nowadays are largely thought of as "pistol" cartridges that happen to be chambered in a few rifles. If it weren't for the cowboy action crowd, it's likely we wouldn't even have limited runs of lever actions from Winchester and Marlin, let alone Italian and Brazilian copies. Colt has even seen fit to chamber third generation Model Ps (and New Frontiers) in .44 WCF while single-action copies continue to be imported from Europe.

The odd fact about the .44 and .38 WCFs is that they were never really admitted into the smokeless powder handloading era with much forethought. Even now, nearly 160+ years after they were introduced with 200- and 180-grain lead bullets, respectively, over 40 grains of black powder in a reloadable centerfire cartridge case, reloading dies are designed for black-powder loads.

Back in 1873, cartridges were designed to use a caseful of black powder to the base of the bullet. With the bullet secured in the case by a crimp on the ogive and a caseful of powder underneath, the bullet was literally "locked down" fore and aft. In lever-action rifles, where the combined forces of recoil and compression of the magazine spring caused the cartridges to be jostled back and forth, a caseful of powder prevented the bullets from being pounded down in the case neck.

The result was that few of the bullets in black-powder cartridges had a crimping groove, and reloading dies were designed to seat the bullet on top of a caseful of black powder, topped off with a mild to moderate crimp to keep the bullet from wandering out the case neck.

The original black powder rifle loads also worked fine in revolvers, since a caseful of black powder would prevent the bullet, for whatever reasons, from being jammed down in the case neck, and the crimp on the ogive would prevent it from moving forward during the recoil impulse in a revolver.

With less than a caseful of smokeless powder, however, ammunition manufacturers began using a

All these .40-caliber cast bullets are suitable for the .38 WCF, but the base band and lubrication groove extend below the too-short case necks produced by standard full-length sizing dies.

cannelure at the base of the bullet to keep it from being jammed down in the case neck while riding out the rigors of recoil and magazine spring tension in lever actions. With a crimp on the bullet ogive, smokeless loads were fine in revolvers as well.

Unfortunately, reloading dies did not keep pace with the times. With black powder, the length of the case neck doesn't matter; however, with smokeless loads it does, since the cannelure on the case neck has to be at the base of the bullet. And nowadays reloading dies for the .44 and .38 WCFs do not restore the case neck to factory length.

Some of the problems associated with a too-short case neck are dealt with by using a bullet with a crimping groove, to hold the bullet regardless of whether it might be fired in a revolver or a lever-action rifle. Until recently, however, with the advent of the RCBS 40-185-SWC and 40-180-CAS (see Mike Venturino's comments elsewhere in this magazine), there has been no such bullet for the .38 WCF.

Folks could get by with a few .44-caliber bullets (.429 to .430 inch) that were designed for the .44 Special or Magnum with a crimping groove, and the RCBS 44-200-SWC was designed specifically for the .44 WCF and is traditionally sized to .427 or .428 inch. With a number of .44-caliber bullets, however, the base of the bullet and most of the lubrication groove extend below the base of the short case neck, limiting contact between the bullet and the case neck to the surface of the middle or second driving band and a short section, roughly .15 to .25 inch (depending on which outfit manufactured the die) of the case mouth. Similar problems plagued the .38 WCF.

A .38 WCF handload (1) with a short case neck is shown with the RCBS 40-185-SWC (3) in a partially sectioned case neck (2) to show how the lubrication groove and base band extend below the case neck. A factory load (4) is shown for comparison.

Winchester factory .44 WCF loads with jacketed (left) and lead (right) bullets are shown with a once-fired case that has been sized in a current full-length sizing die.

Considering the relatively thin case walls that are common to .44 and .38 WCF brass and limited contact between the case mouth and the bullet, it is not difficult to figure that case neck tension (pull/hold) on the bullet is minimal. This explains why it is difficult to gain complete combustion with relatively slow burning powders like 2400 or H- or IMR-4227 in the .44 and .38 WCFs.

Owing the lack of bullet pull associated with the .44 and .38 WCFs, they are at their most efficient when loaded with fast- to moderate-burning powders, up to and including Unique and/or Blue Dot, on the relative burning rate scale that doesn't require a high degree of bullet pull to burn efficiently at appropriate temperature and pressure.

The best option, however, is a proper set of reloading dies that restores the case neck to factory length – to the cannelure – and that provides sufficient bullet pull on

cast and jacketed bullets for use in revolvers and lever actions. (Brass used for Winchester cowboy loads and Remington and Starline component cases, among others, do not have a cannelure.)

The oddball out in all this is that .44 and .38 WCF chambers are usually cut long to the shoulder, so the shoulder on the fired case moves forward, effectively causing the case body to lengthen and the neck to shorten. Unfortunately, full-length sizing dies use the relocated shoulder position (chamber drawings that date back to the 1870s) as a base line and do not restore the shoulder to its factory position.

I found this out when I happened to acquire a foreign copy of Winchester's Model 73 rifle with a properly cut .44 WCF chamber, and reloading dies on hand from RCBS and Hornaday at the time, and Redding currently, would not restore the shoulder position on a case that was fired in any other rifle or handgun to fit in that rifle.

The Lyman 429215 GC (2) is shown in a loaded round (1) with a long case neck and a crimp over the forward edge of the first driving band for use in lever-action rifles. A loaded round (3) with a factory-length case neck is shown with the Lyman 42798 (4) that was designed for black-powder loads without a crimping groove and the RCBS 44-200-SWC (5) with a crimp groove.

Several years ago at my request, the folks at RCBS were kind enough to make a .44 WCF full-length sizing die that moved the case shoulder back to where it should be, not only to fit in the above mentioned rifle, but also to provide sufficient bullet pull on cast and jacketed bullets. It worked fine, so a couple of years later, I asked for a similar die for the .38 WCF, which I'm told by several *Handloader* readers is currently labeled, "38-40-FL Scovill," part number 57081.

As an interesting side note, apparently the folks who put the 14th Edition of the *Speer Reloading Manual* together (which is owned by ATK, which also owns RCBS) recommend the use of Winches-

ter factory brass with the appropriate neck length, rather than the use of standard RCBS .38 WCF dies on previously fired cases. So you load a few hundred unfired Winchester cases and shoot them . . . then what?

Using the .44 and .38 WCF custom full-length sizing dies, the case shoulder is moved back to its factory location and the appropriate neck expander bumps the inside neck diameter .002 inch or so, leaving a cannelure/constriction at the base of the bullet. This prevents the bullet from being hammered down in the case neck while riding out the accumulated effects of recoil and magazine spring tension, and it works fine for revolvers as well, mostly because of the uniform neck tension the factory case neck length provides.

Some folks have voiced concern that moving the case shoulder back and then having it blown forward when the round is fired overworks the brass, leading to case neck failures or busted case bodies. As a rule, Winchester and Remington .44 and .38 WCF brass will last up to six or seven firings with 16.5 grains of 2400 with 200-grain cast or jacketed bullets, which qualifies as a top load in Model 92 Winchesters and Colt single actions, or their copies. Bumping that load up to 18.5 grains will cut case life significantly, ultimately leaving the forward half of the case stuck in the chamber. For folks who have read about those 25.0- to 30.0-grain charges with 2400 and IMR-4227 in loading manuals of yesteryear, I can only suggest they must have been insane. I've never had a Remington .44 WCF case survive two loads with 20.0 grains of 2400.

Starline brass will last almost indefinitely, assuming you don't try to make a magnum out of either cartridge. Just don't exceed 18.5 grains of 2400, whether you use a long or short case neck. Sloppy chamber dimensions in some foreign Model 73 and 92 copies will also lead to premature case failure. I've never lost a case to a Colt .44 or .38 WCF revolver load in a SAA, New Frontier or New Service.

Of course, nowadays, we have cartridges designed for revolvers that are chambered in lever-action rifles, e.g., .44 Magnum/.44 Special, .357 Magnum/.38 Special, .41 Magnum and the .45 Colt. All of them, of course, can be full-length sized with the ever popular carbide dies that size the inside neck diameter from .002 to .004 inch less than bullet diameter. Then the neck expander bumps the neck diameter up from .001 to .003 inch or so. Seating a .429-inch bullet, for example, in a case neck with an inside diameter of .426 inch or less causes the bullet to expand the neck diameter, leaving a visible shoulder at the base of the seated bullet. (The late Dave Andrews, the long-time Speer ballistician, once suggested this

reminded him of an ostrich that swallowed a baseball.) This shoulder, along with a crimp in the appropriate groove on the bullet, prevents the bullet from moving forward during the rearward recoil impulse in a revolver or rifle and prevents the bullet from being jammed into the case while being slammed back and forth in a magazine tube.

The irony of all this is that we have less-than-ideal reloading dies for the .44 and .38 WCF rifle cartridges that make them more appropriate for use in revolvers than rifles and modern revolver cartridges that are more suited for use in rifles than two of the most historic lever-action rifle cartridges.

Neither am I under the delusion that the .44 and .38 WCFs are the darlings of the pseudo "gunny" mindset, mostly because they aren't adaptable to an AK-47 or polyester pistol. If either cartridge were more popular, I wouldn't be writing this, since the reloading dies would have been fixed long ago.

This Winchester .38 WCF reloading tool patented October 2, 1874, and November 7, 1882, was made for black-powder handloads. The round on the right shows the short case neck made by this hand tool. The cartridge on the left was formed from a load previously fired in a Model 73 Winchester and mirrors the shoulder location of the factory chamber.

Having to pay for a special order full-length die to re-form cases so they can be properly reloaded for the firearm they were originally, and historically, designed to be fired in doesn't make a lot of sense either.

Then there is always a last-ditch solution: grinding about .25 inch off the bottom of a full-length sizing die so the case can be pushed farther into the die, lengthening the case neck. That's what folks at RCBS did when they made the .44 FL die several years ago. It's still a good option, or folks can use a grinding wheel mounted on a motor or electric drill that will cut through the casehardened surface of the die. Square the cut up with a good file or a flat semicoarse stone, stone the burrs off the inside corner and that's it. This voids the warranty, of course, but it makes better ammunition. •

.225 Winchester

BULLETS & BRASS

by Brian Pearce

Q: I shoot and reload a .225 Winchester. Alas it is a fading cartridge, but I grew up with it, and it works fine for me. I would venture to say not much new information has been generated since around 1980, or perhaps 1990 at the latest. The closest I have come to new data is from *Handloader* No. 263 with one reference using Western Powders Ramshot TAC.

Not trying to fall into the "If it's not broke, why fool with it?" category, sometimes I get the itch to try something not in any of the manuals. Newer powders such as IMR-4007 SSC, IMR-8208 XBR, a new Vihtavuori or Ramshot powder, or one of the new explosive tipped varmint bullets may prove fun and interesting. None of these newer powders are included in the .225 Winchester section of current manuals. I value my body parts enough to not just experiment, especially without a background in winging it at working up loads. Elmer Keith I ain't.

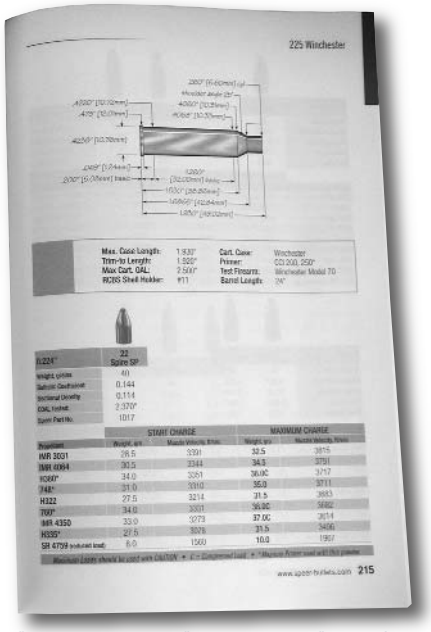
What could the weekend handloader do to get a grasp on approximate minimum and maximum loads with unpublished powders or bullets?

– B.W., Bloomfield KY

A: *You raise an excellent question and a problem that is not unique to the .225 Winchester, as there are many cartridges that are not being updated with newer powders and bullets.*

In measuring the water capacity of the .225 Winchester case and comparing it with that of the .22-250 Remington, you will want to reference existing data for the .22-250 (using the same bullets and powder) and reduce listed "starting" charges by 4 to 5 grains. Then increase charges carefully, preferably 0.5 to not more than 1.0 grain at a time. Check the velocities over a chronograph. When speeds begin to approach that of factory loads, it is time to scrutinize pressures closely.

I would also suggest measuring case head expansion, which should



The .225 Winchester can benefit from the same powders that are used in the .22-250 Remington. Charges, however, should be reduced around 5.0 grains, depending on powder type.

not exceed .0003 to .0005 inch maximum. SAAMI standard pressure for the .225 Winchester remains at 50,000 CUP. Maximum loads will probably contain 3.5 to 5.0 grains less powder than maximum listed loads for the .22-250 Remington. Be certain to use only .22-250 Remington data (and powders) that are from credible sources. Each load should be checked for accuracy, as you might find that "sweet" spot before reaching maximum.

Colt's .45 Colt

Q: I recently acquired my second Colt Single Action Army .45 Colt revolver, which was manufactured in 1926. My other gun was built in 1960 and is likewise a .45 Colt. My question has to do with chamber throats, which I know you have discussed and informed us of considerably over the years. I do not have a great method to measure the throats. I do have dial calipers that can measure up to .001 inch, but I am not confident that my readings are accurate.

My questions are: What year did Colt begin to increase the throat size from .454 inch (prewar) to .456 and .458 inch? Without purchasing specialized tools, is there a way I can accurately determine throat size?

– T.L., Boise ID

Colt Single Action Army revolvers chambered in .45 Colt have varied in throat dimensions over the past 138 years. This 1936-vintage revolver measures .455 inch.

A: *Most early (1873 to 1900) black-powder-era Colt Single Ac-*

tion Army .45 Colt revolvers had a .450- to .451-inch throat diameter, which helped build pressures and aided in powder ignition. (As a side note, chambers had a .007-inch taper, which is no longer present in any modern manufactured guns chambered in .45 Colt.) There are no absolute cutoff dates or serial numbers, but by around 1900, or serial number 192,000, throats have been observed at .451 to .453 inch. By the 1920s it was common to measure guns with throats of .454, and in the 1930s .455 to .456 inch was prevalent. In the post-World War II era or "second generation" guns, the same chamber and throat dimensions were used. By the 1960s and 70s, it became common to find guns with .457- and .458-inch throats. Likewise most "third generation" guns (1976 through present) feature .457/.458-inch throats (and sometimes even larger), however, there is an occasional exception that has been found with .452-inch throats.

The best method to measure throats is with a plug gauge set (available from Grizzly Industrial; 1-800-523-4777 or www.grizzly.com) that comes with plugs sized in .001-inch increments. With practice you can get a reasonable reading using calipers. Lufkin offers a handy Hole Measuring set that has adjustable spuds to fit the hole and once it is adjusted, is removed and measured using a micrometer. Bullets can also be used to get a general idea. For instance we have commercial cast and jacketed bullets that measure .451, .452, .454, .455, .456 and .458 inch, which can be inserted into the throat to get an idea of its size. Unsized cast bullets can be measured in their "as cast" form and likewise used as a make-do plug gauge to get additional sizes. Slightly oversized soft lead roundballs can also be pushed through the throats (slugging) and then measured.

*(*Editor's note: *.30-06 based brass – .270, .280, etc. – tapers from .440 to .470 inch. Put case in chamber mouth until it stops, twist to score a line on case body then measure case diameter at that point.)*

Belt Mountain Punch Solid

The 270-grain Belt Mountain Punch solid generally has an overall cartridge length of 1.675 inches, which feeds through Marlin Model 1894 .44 Magnum rifles.

Q: In your article in *Handloader* No. 258, you state that the 270-grain Belt Mountain Punch solid bullet is for use in handguns. The bullet impresses me, but I do not have a revolver; I have two Marlin Model 1894 carbines chambered in .44 Magnum. I have loaded and fired Sierra 300-grain jacketed softpoints (JSPs), which have an overall cartridge length of 1.750 inches. The Sierra bullet box states that they are for revolvers, but they feed from the magazine into the chamber in one of my carbines, but not the other. I am hoping that the 270-grain Belt Mountain Punch solid bullet will have a shorter nose than the Sierra and will feed in both Mar-

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lin carbines. Do you recall what the overall cartridge length was? Thanks for your assistance.

– E.R., Deer Park NY

A: *The Belt Mountain Punch solid 270-grain version has a nose length of .390 inch and when crimped properly in the groove, results in an overall cartridge length of around 1.675 inches (depending on case length). SAAMI lists a maximum length for the .44 Magnum at 1.610 inches. Considering that one of your Marlin carbines will feed a cartridge measuring 1.750 inches in length, it sounds like it will function with the above bullet. Since this cartridge exceeds SAAMI specifications slightly, it may not feed in both of your guns. If it does not, I might suggest trimming your .44 Magnum cases down to 1.225 inches, which would result in an overall cartridge length of around 1.610 inches. If you choose to do this, I would suggest reducing your powder charge by one grain with common magnum revolver powders such as Accurate No. 9, H-110 and 2400. Another option includes modifying your Marlin to feed the longer cartridge, which is relatively easy for a qualified gunsmith to accomplish.*

Model 1893 7mm Mauser —

Q: I have a Model 1893 Mauser rifle chambered in 7mm Mauser and would like to begin handloading for it. I understand that it originally drove a 175-grain bullet around 2,400 fps. Since my gun is military original, and to get it to sight properly, I would like to stick with that bullet weight and velocity. Can you suggest a load? Thanks for your help and for such a fine magazine.

Alliant Reloder 22 and IMR-4831 are excellent powders for handloading the 7x57mm Mauser with 175-grain bullets at standard pressures and for vintage rifles.

– S.F., Tucson AZ

A: *You do not indicate the condition of your gun or if you have ever fired it. I would suggest having it checked by a qualified gunsmith to make certain it is safe before proceeding.*

Assuming that it checks out okay, using the 175-grain Speer Mag Tip with 43.0 grains of IMR-4831 results in 2,233 fps from a Ruger Model 77R with a 22-inch barrel and should go faster in the longer barrel found on your rifle. For even greater velocity, try 47.0 grains of Alliant RL-22 for 2,389 fps (from the same 22-inch barrel). The bullets were seated with an overall cartridge length of 3.00 inches. Both loads should be considered maximum for the age, steel, design and strength of your rifle. I would suggest starting 3.0 grains below the suggested charges, checking for signs of excess pressure before proceeding with maximum loads. •

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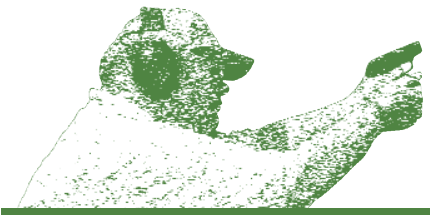

Frequently Wrong but Never in Doubt

PISTOL POINTERS by Charles E. Petty

I heard a song the other day that, while it had nothing to do with guns or shooting, struck a real chord with me, because the firearms field has lots of people to whom that applies. The song was "Frequently Wrong but Never in Doubt" by Cheryl Wheeler. It was written about a family friend.

The lines that got me were: "And he was easily riled, likely to shout: 'Frequently wrong but never in doubt.'"

Many sports have a supply of lore or mythology that are accepted on faith as gospel, but shooting has a bunch. Since there is some science involved in guns and ammunition, and science is based on theories; if it sounds reasonable, somebody will believe it. Now if that theory is passed around enough, chances are good it will become conventional wisdom and, therefore, cast in stone. Mythology is full of dragons, and we know how hard it is to slay those.

The world of firearms really is pretty close to rocket science, but it is ignored by the education establishment. Physics 101 will help a little in understanding how bullets fly, but graduate level thermodynamics is necessary to begin to get some clues about what happens inside the cartridge when a gun goes *bang*. This encourages a perfectly human flaw of making no distinction between *believe* and *know*. Of course, many of the things we believe are perfectly true, but just because somebody tells us something doesn't make it so. The subject is so complex that nobody can know everything. Sadly some think they do or, worse still, want us to think that. In the immortal words of Dirty Harry: "A man's gotta know his limitations." Unfortunately sometimes that is easier said than done.

One of my character flaws is that after a lot of years as a scientist and cop I've come to rely on evidence . . . or proof. So, much of my work has involved trying to devise a test that will shed some light on myths associated with shooting and reloading. One of the most durable has to do with sorting and segregating brass. You know we are told to be sure to use all the same make of brass and preferably from the same lot. Furthermore we need to keep each lot together; heaven forbid they should be mixed.

As a pistol shooter, I have a fondness for accurate 1911 pistols; and since a well-accurized gun is capa-

ble of great accuracy, and the .45 ACP is easy to load, an idea grew on me. I had developed a load that shot really well, so it would be easy enough to do a test with the make of brass as the only variable. The load was 5.8 grains of Power Pistol with a Remington 185-grain jacketed semiwadcutter (JSWC) and Federal primers. I did a similar experiment with ball ammunition and found that the same charge of Power Pistol with the Remington 230-grain full-metal-jacketed (FMJ) bullet was an excellent hardball duplicate.

One of the crosses I bear is that once upon a time I had a lesson in statistics. From it I learned that just because there may be a few 10ths difference from one group to another, it doesn't mean the smaller one is better. But I decided to test the conventional brass wisdom and loaded 50 rounds each in once-fired Remington, Winchester, Federal and CCI brass and 50 more in a mix of the four cases. They were fired in a Rock River gun I've had for some time and know how well it shoots, so there were five, 10-shot groups with each load at 25 yards from the Ransom Rest. Looking at the big picture, the mixed brass had a smaller average than all the others. This was true for both the wadcutter and hardball loads. I don't think either result would have shown a statistically significant difference, but the raw number data sure looked good.

I've done similar experiments with other handloading "rules," like cleaning primer pockets, that didn't show anything either. Maybe if we had guns that could be accurate to the third or fourth decimal it would, but then again I've watched the most obsessive group of shooters – the benchrest guys – and they don't clean primer pockets either.

Of course, I published all this, and guess what? I still read that we should sort brass, and more than a few letters came telling me I couldn't possibly be right. My best guess is that some of those

people would fit this subject pretty well. Of course, my story had lots of data and their letters had none. The basic theme was "everybody knows . . ." I've even met a few who told me, emphatically, that my conclusions were wrong, but when I asked for evidence it didn't come, so more than once I've told people to write their own bloody article.

Perhaps the most common is the guy who tells us that this gun or cartridge is the ultimate *best* (yes, I know that's redundant), but some people go a bit overboard, you know. The truth is that consensus will never emerge from those arguments, and it's pointless to try. How long has the .30-06 versus .270 fuss been going on? More than a few writers have feathered their nests taking one or both sides of that fight. I've heard arguments get loud and heated and been told of some who came to blows. Maybe that's the only way a winner emerges. I learned long ago that it is best just to smile sweetly and walk away. I'm sure you've heard of the person who doesn't want to be confused with facts, and they are more common than we think.

Of course, not everyone is hopeless, and there are some who are rarely wrong and never in doubt. Such a man was my teacher and mentor, the late Bob Day. I'm pretty sure his favorite phrase was "dammit, Charlie" as I learned how to build guns. But years later I was in his shop one day, and he made a statement about a gun that I knew to be wrong. Sometimes we get little gifts like that, and he had one in the showcase. I've long since forgotten what the point was but will never forget the look on his face when he saw he was clearly wrong. It was also the time when I knew that I had finally made it in the eyes of my hero.

I bet almost all of you know someone who might fit that description. I know I do. One is a dear friend who has very strong opinions with which I often disagree. I quit trying to change his mind years ago, so we get along just fine.

And the last lines of the song are good too: "I don't know why we loved him, I just know we did." •

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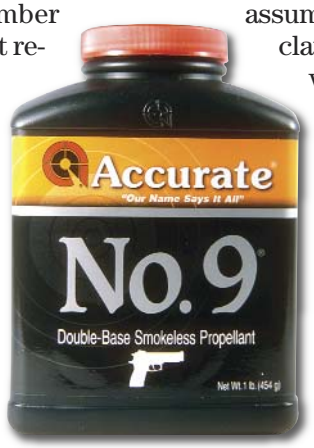
Accurate No. 9

PROPELLANT PROFILES by R.H. VanDenburg, Jr.

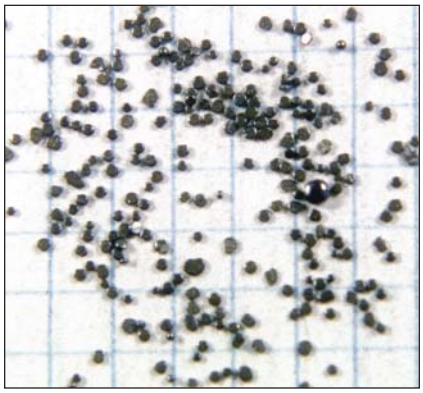
Some may recall we covered Accurate No. 9 powder on these pages not long ago (*Handloader* No. 256, November 2008 to be precise). That report left room for more experimentation with other cartridges and bullet weights. Since then, however, Western Powders of Miles City, Montana, owner of Accurate powders, has changed sources for many of its handgun propellants, including No. 9, by shifting production to St. Marks Powders in Florida. St. Marks Powders is the former Olin Corporation facility now owned by General Dynamics and the only ball (spherical) powder manufacturing facility in the country. My interest, then, in taking another look at No. 9 became twofold: to expand on the cartridge and bullet selections of the previous review and to compare my older lot to current production.



Some may also remember No. 9 was introduced in the early 1980s as Data Powder and by 1985 had assumed its current nomenclature. Its original source was IMI (Israel Military Industries). After an explosion at that facility early on, manufacture of No. 9 was transferred to a plant in the Czech Republic. When I requested a sample of the new St. Marks iteration of No. 9, it arrived in a container labeled "Made in Belgium." Confused, I again contacted the folks at Western Powders. The Belgium label, I was assured, was simply an attempt to use up old stock, and the powder I received was most assuredly made at St. Marks. Still, this leaves us with another chronological source: IMI, the Czech Republic, Belgium and St. Marks. The Belgium manufacturer is actually P.B. Clermont, maker of most of Accurate and Ramshot spherical powders.

Regardless, the new lot is quite similar in appearance to the earlier lot on hand despite likely having been produced by a different manufacturing process. Its burning rate, as close as I can determine, is too similar to my older lot to be distinguishable. That is to say, side-by-side tests of old and new powder lots using the same components produced velocities that did not differ – up or down – more than one would expect from similar tests using the same powder lot. All of which means all parties did their jobs, and No. 9 load data is valid regardless of source. Most published data will likely have been developed from Czech Republic or Belgium lots but present no problem for users of the newest St. Marks manufactured powder.

Accurate No. 9 is still a double-base spherical powder with a ni-



Selected Loads Accurate No. 9

cartridge	bullet (*grains*)	charge (*grains*)	velocity (*fps*)
.357 Magnum	140	14.0	1,374
	158	13.5	1,311
	180	12.0	1,153
.40 S&W	180	11.0	999
.41 Magnum	210	16.5	1,117
	220	16.0	1,073
.44 Magnum	240	20.0	1,472
	270	16.0	1,182
.45 Colt	250	18.0	1,152
	300	15.0	840

Notes: Federal Magnum Pistol primers used throughout.

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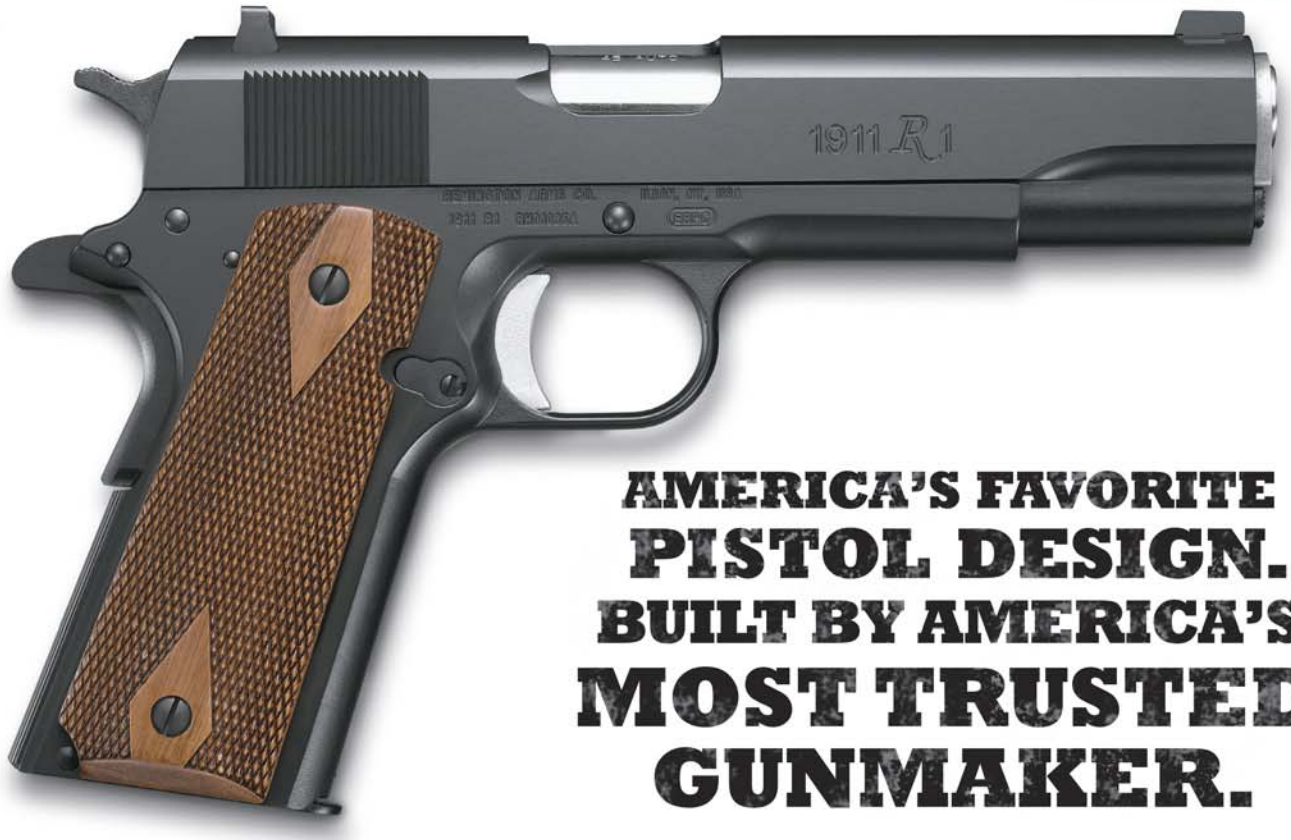

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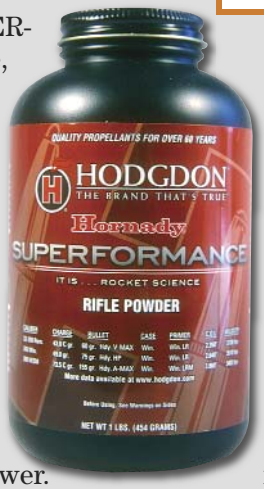
Hodgdon's Superformance

Readers may remember in the last issue we reviewed the Hodgdon Powder Company's new LEVERevolution powder and how Hornady Manufacturing, the bullet, ammunition and reloading folks, had blazed several trails in new cartridge, bullet and ammunition design. Specifically, Hornady worked with St. Marks Powders to create precisely blended powders for its ammunition line of the same name. Hodgdon, in turn, worked with Hornady and St. Marks Powders to release a LEVERevolution canister powder. It is blended with wider parameters to incorporate more cartridges but still is paired only with those cartridge/bullet weights where velocities will exceed all other published data by 100 fps or so.

Now, the second powder in the line: Superformance. It is slower-burning than LEVERevolution, and the Hornady line of Superformance ammunition, again, precisely blended for each cartridge, is considerably larger than its LEVERevolution line. As before, Hodgdon is offering its Superformance canister powder for use in a narrow range of cartridges while maintaining superior performance. It is interesting to note that in the *Hodgdon Annual Manual, 2011*, Superformance is only listed with six cartridges: .22-250 Remington, .243 Winchester, .243 WSSM, .25 WSSM, .300 RCM and .300 WSM. The label also identifies the powder as "Hornady Superformance." In a flyer published by Hodgdon that I picked up at the SHOT Show, Superformance data is also listed for the 6mm Remington, developed, no doubt, after the 2011 manual had been put to bed. In the new *Hornady Handbook of Cartridge Reloading, 8th edition*, Superformance is paired with five cartridges, only two of which appear in the Hodgdon list: .22-250 Remington, 6.5 Creedmore, .30-06, .300 RCM and .375 Ruger. This gives us a total of 10 cartridges. That's good, though, as to expand the list beyond those cartridges in which it gives superior performance would defeat the purpose.



Much like its LEVERevolution littermate, Superformance is a double-base, spherical powder with a nitroglycerin content of 14 percent and a bulk density of .985g/cc. Its neighbors on burning rate charts include Hodgdon H-414/Winchester 760 on the faster side and the various 4350s on the slower.

I selected only four cartridges for review. In the .22-250 Remington, only bullets of 60 grains and more are recommended. While I rarely employ such weights in my own shooting, I chose to test a pair: a 60-grain Hornady and a 70-grain Speer. Published maximums were both compressed, so I backed off a bit, but velocities were very high and accuracy excellent, especially for a very windy day. In the .243 Winchester, things were just the opposite. Published data paired Superformance with light bullets, something I use infrequently in my Remington Model 700. This rifle has always preferred heavier bullets, and I've used it more for deer and antelope than varmints. Still, with Sierra 75-grain bullets performance was excellent. I've often written of this well-worn barrel that gives up velocity while remaining quite accurate. That's exactly what happened here, recording velocities about 150 fps under expected speeds while notching sub-one-inch groups.

Next came the .30-06 with Hornady 165- and 180-grain Spire Points. Somewhat to my surprise, what had been very good extreme spreads now became even better in spite of the larger case capacity. In fact, the 180-grain, .30-06 load and the 150- and 165-grain .300 WSM loads recorded extreme spreads of 8, 6 and 5 fps, respectively, in five-shot strings. That's amazing. All the loads in this report used Federal 210 Large Rifle primers, except the .300 WSM loads in which I used Federal 215 Magnum primers.

The .30-06 produced much higher velocities than expected. This must also indicate healthy pressures, but all other signs were normal and the small extreme spreads seem to bode well. Accuracy was as good as this rifle produces with hunting bullets.

The .300 WSM was paired with 150- and 165-grain bullets – both Hornady's. Velocities were a tick under projections but still exceeded that of other powders, and accuracy was consistent with this rifle's high level of past performance.

Superformance should be available now in one- and 8-pound containers. •

Selected Loads Hodgdon Superformance

cartridge	bullet (*grains*)	charge (*grains*)	velocity (*fps*)
.22-250 Remington	60	42.0	3,622
|	70	40.0	3,424
.243 Winchester	75	49.0	3,358
.30-06	165	61.0	2,828
|	180	59.0	2,766
.300 WSM	150	74.0	3,358
|	165	72.0	3,213

Notes: Standard Federal 210 Large Rifle primers were employed in all loads, except the .300 WSM, where magnum strength Federal 215 primers were used.

Be Alert – Publisher cannot accept responsibility for errors in published load data.

troglycerin content of about 10 percent, a bulk density of approximately .935g/cc (It has changed slightly over time.) and a nominal granule thickness of .015 inch. The current St. Marks manufactured lot appears to be more of a mixture of round and irregularly shaped balls than that from previous sources, which were simply spherical but otherwise the same. Metering, as would be expected, is flawless. Barrel residue, at the pressures best suited for the powder, is minimal. No. 9's burning rate is slower than such powders as Alliant's Blue Dot and 2400 yet faster than Winchester 296 or Hodgdon's H-110.

In addition to that published by Accurate, load data is included in manuals from Hornady, Lyman, Speer and Barnes in cartridges from the .327 Federal Magnum to the .500 S&W Magnum. Velocity is seldom maximum, falling slightly behind slower powders, but accuracy is often top notch with velocities still at quite satisfactory levels. Lyman lists No. 9 as "potentially most accurate" in the .38 Super, .357 SIG and 10mm Auto pistol cartridges with one or more bullet weights and likewise in the .41 Remington Magnum, .454 Casull and .500 S&W Magnum revolver cartridges. I have become particularly fond of No. 9 in the .357, .41 and .44 magnum revolver cartridges with perhaps the .41 being the best fit.

When I did my testing, I used magnum pistol primers exclusively. I began with the .357 Magnum, expanding bullet weights to include 140, 158 and 180 grains in a 4⅝-inch Ruger Blackhawk. All performed admirably. I added the .40 S&W this time with 180-grain bullets and was quite impressed. The gun, a Star, functioned flawlessly, and accuracy was all one could expect.

My favorite cartridge for No. 9 is the .41 Remington Magnum. Here I fired Speer 210- and 220-grain bullets from another 4⅝-inch Ruger Blackhawk. This is a very accurate gun, as most such guns were, with chamber throats and barrel groove diameter of .410 inch. Velocities are high and groups are small. This is an excellent pairing.

My .44 Magnum is a Ruger Super Blackhawk, old model. Both Speer 240- and 270-grain bullets were very accurate and velocities all I needed. I restricted my .45 Colt testing to a Ruger Vaquero with its acceptance of higher pressures. No. 9 is not the best powder for the 15,000 psi levels of typical single actions. In the Ruger, however, although the velocities were modest, accuracy was very good and both the 250- and 300-grain loads would suffice for most uses.

All in all, I am delighted to find Accurate No. 9 hasn't changed and that it is now being manufactured domestically. May it forever remain so.

Choosing a Bullet for Big Game

FROM THE HIP

by Brian Pearce

The two Winchester Platinum Tip (250-grain) bullets on the left were recovered from game and demonstrate reliable expansion, while the two Keith pattern cast bullets on the right show no expansion but rather slightly deformed noses from striking bone. The former offers larger wound channels but less penetration, while the latter gives notably greater penetration.

Choosing the correct bullet when hunting big game with a handgun (utilizing straight-walled cartridges) is a key ingredient for success. Today there are many choices that offer quick expansion, controlled expansion or deep penetration and range from lightweight to heavyweight for a given cartridge. Correctly matched to the animal, the right bullet will cleanly take big game animals throughout the world, but using the wrong bullet may result in failure by wounding and possibly losing that animal.

Big game species are not equal in weight or structure, and bullets should be tailored to specific applications. Two extreme examples from the "deer" family are an Alaskan bull moose that can weigh 1,700 pounds and beyond and a whitetail buck that often weighs as little as 160 pounds. By adding black and grizzly/brown bear, pronghorn, elk and other game in the mix, it becomes clear that choosing just one bullet for all game is less than ideal.

The most reliable bullets on moose, bear and heavy game will penetrate deeply through muscle and bone, pass through the vitals and (in a perfect world) exit. Depending on the angle of the shot and size of game, this can be as little as 10 or so inches or as much as 36 inches or more, which takes a good bullet to get the job done – especially after encountering bone. Many years ago an acquaintance shot a large Alaskan brown bear in its backside with a .500 Linebaugh (custom Ruger Blackhawk) using a heavy cast bullet, weighing around 440 to 450 grains, that could not be found. The bear measured 10 feet from nose to tail. When the taxidermist boiled the skull, the bullet was found in the brain. Bullets that are ideal for this task are generally non-expanding solids and can include jacketed or cast. Weights are usually on the heavy side for a given caliber. The .44 Magnum is an example, a cartridge that others are compared to for hunting and has a standard bullet weight of 240 grains. The best bullets usually weigh at least that much, or more, with 250-, 275-, 300- and 320-grain weights generally being better choices due to their higher sectional densities that result in greater penetration.

Some may wonder why I am beating the penetration drum so heavily. Briefly I'll share a couple of field experiences wherein bullets failed to offer adequate penetration. The first includes a prominent public official of Idaho who shot a treed black bear with a .357 Magnum lever-action rifle stoked with 110-grain jacketed hollowpoints (JHPs) handloaded to between 1,400 and 1,500 fps (not full-power loads). From the 20-inch barrel of the carbine, the velocity was similar to a revolver stoked with full-power handloads with the same bullet. The bear was shot several times with virtually no effect – at least until it decided to come out of the tree. The nine-shot carbine was now empty, and the hunter pulled his Colt Trooper .357 Magnum with handloads containing a 158-grain cast SWC bullet (RCBS mould 38-150-SWC) pushed

1,300 to 1,350 fps with 15.0 grains of Alliant 2400. As the bear came down the tree trunk just a few feet away, our hunter placed a bullet broadside through the lungs. The bruin hit the ground running and covered around 100 yards before expiring, draped over a large log. The necropsy proved the last bullet was the only one that did its job. It penetrated straightly and took out both lungs, while the 110-grain JHPs only reached 1 to 2 inches before disintegrating and never came close to reaching the vitals.

A very similar story occurred with a friend who emptied his Smith & Wesson Model 58 .41 Magnum into a treed black bear . . . twice. The bear likewise came out of the tree, and the battle really began, but the bear was eventually killed. The 210-grain jacketed softpoint (JSP) bullets were hitting the dense muscle and bone and stopping just 1 to 3 inches under the skin. Every bullet that struck the bear in the body was recovered and examined. They varied from jacket and core separations to deformed noses that caused the bullet to tumble or turn and thus failed to penetrate. With the leftover ammunition, velocities were checked at around 1,200 fps, which is adequate had the bullets been up to the job. If our hunter had used the 220-grain Keith bullet or LBT pattern 230- to 275-grain bullets at similar speeds, they would have perforated the vitals and exited at any reasonable angle.

Examples of .44-caliber solid non-expanding hunting bullets include (left to right): Lyman/Keith 429421 cast 250 grains, Barnes 300-grain FN FB Buster, Belt Mountain 300-grain Punch solid, Oregon Trail True Shot 310-grain WNFP GC cast and SSK cast 320 grain.

Another circumstance that requires extreme penetration is heavy African game, such as buffalo, hippo and elephant. Many years ago the late Larry Kelly was using .44 Magnums to drop elephant with a single (brain) shot using a Ruger Super Blackhawk with a 4⅝-inch barrel. He shot many other large game species, including hippo and buffalo. Larry ulti-

mately settled on 320-grain cast bullets from SSK moulds, which he helped design. Today, the Belt Mountain Punch solids should be considered the ultimate in reliable and deep penetration.

Moving on to whitetail deer – the most common big game animal hunted with a handgun – solids will take them cleanly, especially when bone structure is encountered. Outstanding non-expanding game bullets usually feature a flatnose or meplat, which offers shock, aids in deep penetration by preventing tumbling, cuts a permanent wound channel and leaves a reliable blood trail. These features make them effective for deer. However, it has been my experience that a controlled-expanding bullet will destroy even more soft tissue while penetrating deeply enough to exit, even on quartering angles, and still leave that important blood trail. This often results in a drop-in-tracks type performance, or the deer will travel little after the shot.

Jacketed hollowpoint (and softpoint) bullets that offer reliable expansion from Speer, Sierra, Hornady and Nosler generally offer excellent terminal performance on deer-sized game.

A couple of months ago, I was hunting whitetail deer in Texas and noticed that deer shot with a Smith & Wesson .44 Magnum using Winchester 250-grain Platinum Tip factory loads and Hornady 240-grain XTP-HPs (a handload with 21.0 grains of Accurate No. 9) were going down just as fast as those taken with rifles chambered in .270 Winchester, .270 WSM, .30-06 and .300 WSM. In most instances 8 inches of penetration were all that was required for bullets to exit, but on raking shots 12 to 14 inches were easily achieved before exiting. I was happy with their reliable performance. Personally, I tend to favor 240- to 270-grain bullets (in the .44 Magnum) for hunting deer, as they offer a near ideal blend of penetration, flat trajectory and reliable expansion at distances well beyond 100 yards.

Whitetail deer seem to live on nerves and can run considerable distance after being hit vitally, but with the above expanding bullets most deer literally went down in their tracks or within a few feet after being hit. The ones that traveled most (all traveled less than 50 yards) left a heavy blood trail that made it easy to walk right to them. Shooting distances were typically between 50 and 80 yards but have also extended beyond 125 yards with the same effect. Several deer have been taken successfully with Speer 240- and 270-grain Gold Dot bullets (now known as Deepcurl Handgun Hunting) and Sierra 240-grain JHPs with excellent results.

Solid cast bullet examples include Lyman moulds 429421 (250 grains) and 429244 (255 grains), each being commonly referred to as SWC profiles. LBT patterns are also popular, but the Long Flat Nose (LFN) is generally a better choice for hunting, as bullets remain stable at longer distances and offer straight penetration. An example is the Oregon Trail True Shot bullet. Moving on to jacketed solids, Belt Mountain offers its Punch solid, which is designed to give deep penetration on large, heavy game without deforming. Barnes also offers a Buster solid for popular handgun cartridges, which has proven itself in controlled conditions (a ballistic lab with gelatin and simulated bone) as well as on game.

By carefully matching the correct bullet to the type of game being hunted, that favorite big-bore sixgun can offer incredible performance. •

Time travel at the speed of a 1935 Speedster?

The 1930s brought unprecedented innovation in machine-age technology and materials. Industrial designers from the auto industry translated the principles of aerodynamics and streamlining into everyday objects like radios and toasters. It was also a decade when an unequaled variety of watch cases and movements came into being. In lieu of hands to tell time, one such complication, called a jumping mechanism, utilized numerals on a disc viewed through a window. With its striking resemblance to the dashboard gauges and radio dials of the decade, the jump hour watch was indeed "in tune" with the times!

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The Good Gun Folks

MIKE'S SHOOTIN' SHACK

by Mike Venturino

Anyone even slightly aware of their surroundings knows how firearms enthusiasts have been denigrated for decades by the liberal media. We have been labeled gun nuts, gun crazies, beer-guzzling sign shooters, paranoid misfits and often much worse. What's the truth?

As I see things, the truth is about 180 degrees reverse of how we are portrayed by the media in their campaign against firearms ownership. Unfortunately there are people who fit all the labels put on them by the media. ***But***, those are not true "gun folk" as I know them.

The gun folks I know still believe in decency, honor, integrity and respect for others. I attend weekend shooting matches all through Montana's warm months. Everyone leaves their shooting gear set up under the range cover all weekend, taking only their firearms back to their campers at night. That means that valuable items such as spotting scopes, tripods and such sit out unattended. I have never heard of anything going missing.

All proceeds raised at the benefit turkey shoot went to help two cancer patients.

That's not just a Montana thing. Once, at one of those big cowboy action shoots formerly held in southern California, I managed to drop Yvonne's gun belt, complete with two Colt SAA revolvers, in the parking lot and didn't miss them for at least an hour. Thousands of folks were using that parking lot, but upon rushing to the lost and found, her guns had been turned in. I would have happily paid a reward, but the finder didn't even leave a name.

Those are the sort of gun folks I know about.

For more than a quarter-century, I've had small mail-order businesses to generate a bit of extra money to help pay for travel and shooting event expenses. My best guess is that I've taken in several tens of thousands of checks. Among all of those, I've had precisely one check for about $30 bounce. Several times right at the eve of leaving on a trip, I've received a phone order. Instead of making the customer wait until my return, I've said, "Give me your mailing address, and I'll ship before I leave. Send the payment at your leisure." Never, not once, have their checks failed to be in my mailbox when I got back home.

Those are the gun folks I've dealt with.

Along with the benefit turkey shoot, there was an auction of donated items ranging from horse tack to a pair of mules.

A couple of years ago, the three-year-old daughter of an employee at Montana Vintage Arms, a company producing accessories for the BPCR (Black Powder Cartridge Rifle) crowd, was diagnosed with cancer. The family had medical insurance, but the little girl's illness required travel and layovers as far from Montana as New York City. In an effort to help, Montana Vintage Arms, Shiloh Rifle Manufacturing and some smaller enterprises put together a package to be raffled off. It consisted of a Shiloh Model 1874 Sharps .45-70 rifle, Montana Vintage Arms sights and a scope and numerous accessories. The plan was for a maximum of 500 raffle tickets to be sold for $50 each with the drawing to be held at Raton, New Mexico, during the BPCR Silhouette National Championships. Sales of the tickets didn't start until about June of that year, and the nationals were in August. With the economy in such disarray I feared the $50 tag for tickets would be a stumbling block for many people.

I should not have doubted gun folks. Every single one of those 500 tickets sold. In June I took a string of them to the Montana Regional Championship of which I was match director. Not only did they all sell, but we also had to accept people's money with the promise we would mail their tickets to them. At Raton that August, just before the drawing was held, some of the little girl's battle for her life was reviewed, and better yet, we learned that she was winning.

There weren't a lot of dry eyes among those gun folks upon hearing that.

The upper Yellowstone River Valley here in Montana is a rural setting. In other words there is not a lot of population, so word travels fast when someone needs help. Back in 2010 an outstanding lady named Nicole Wines had both a relative and a friend battling cancer. She wanted to help

(Continued on page 86)

9.3x57mm Mauser

CARTRIDGE BOARD by Gil Sengel

In the early 1800s, French experimenter Paul Vielle succeeded in controlling the burning of nitrocellulose by mixing it with a solvent and then forming it into small, hard particles. The product burned very hot, producing little smoke and residue. It became the first successful smokeless powder.

Application of the new development was obviously military. Little smoke meant the location of a rifleman could not be pinpointed. A lack of residue and fouling made possible practical repeating rifles and the machine gun. This was either very good or very bad, depending whether or not your army could gain access to the technology.

As it turned out, production of smokeless propellants was not all that difficult. Germany had a new rifle and smokeless powder military round in service within a couple of years of the French development.

Of interest to us here is Germany's new cartridge, the 7.9mm Patrone M88 (7.9mm Cartridge Model 1888). The 7.9mm figure indicates *bore* (land-to-land) diameter of the barrel, which was .311 inch. Bullet diameter was .318 inch with a jacketed roundnose.

The shape of the new round was bottlenecked, like the French Lebel, but it did away with the Lebel's large rim. The case obviously needed a rim for the extractor to get ahold of, but here it was the same diameter as the case body. A recess for the extractor to drop into was machined into the case body at its base. This idea, as well as the small-caliber jacketed bullet and bottlenecked case, is credited to earlier work by a Maj. Eduard Rubin of Switzerland's army research facility.

It is hard to determine at this late date exactly how the internal capacity of the Model 88 case was arrived at. Given the continuing popularity of the round, we can only say the designers did a darn good job!

When the 7.9x57mm became Germany's military rifle round in 1888, it was quickly subjected to the same attention as the later .303 in Britain and .30-06 in America. That is, Germany had large numbers of technically minded shooters and hunters who wanted one! Soon gunsmiths were offering rifles chambered for the cartridge. Here is where the trail begins to cross rocky ground. Following it is not easy.

It is known that Mauser, in an effort to sell his military rifles to other countries, would make up a cartridge to suit the customer. This sounds strange considering the 7.9x57mm worked so well. Why change? Simply put, it was recoil. Many countries wanted rifles that kicked less, thus smaller calibers and lighter bullets. We simply can't get away from the role that recoil plays in cartridge selection.

Mauser conducted experiments with both the 7.9x57mm case and others necked to different calibers under 7.9mm. Then when the Model 98 action came into being, the Mauser firm, which had always produced some sporting arms, began to expand sporting rifle production. Not only did this provide worldwide name recognition for Mauser, but it also produced a profit. Here began experiments with (or merely adoption of) hunting rounds of larger than 7.9mm caliber.

Sorting out exactly where the 7.9x57mm necked to 9.3mm first appeared is thus difficult. Some authors insist it was totally a Mauser development. Others say Mannlicher is responsible, as that maker sold sporting rifles so

chambered – or did they? (We will get to this in a moment.) Still, others believe it came from German custom gunsmiths as a smokeless round for use in hunting deer and boar. Also that it was early, as soon as smokeless powder became available for other than military use.

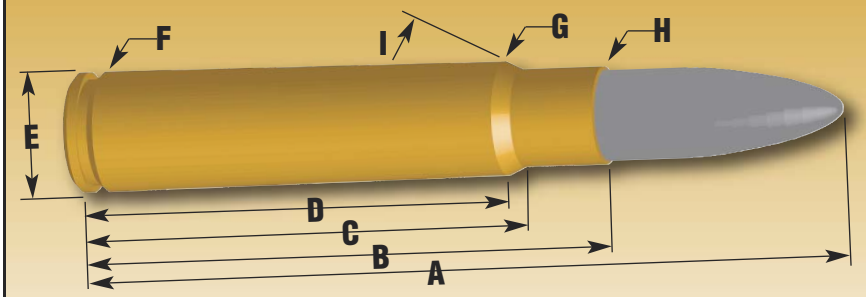
I lean toward the latter explanation, because from everything I can determine, Mauser sold very few 9.3x57mm sporting rifles. Conversely, 9.3x62mm Mausers sold very well. Whenever Mauser literature mentions 9.3mm it means the 9.3x62mm.

Wildcatting, however, was popular in Germany from the very beginning of the cartridge era. That is, wildcatting by gunsmiths who sold ammunition and empty cases to riflemen. The 9.3mm bullet diameter drifts back into the muzzleloading days in Europe. Since much hunting took place in forests at rather close range, the large bullet was logical – and so was smokeless powder. Being able to see how game reacted to the shot, rather than being obscured by smoke, allowed a quick second round if needed.

Note that 9.3mm refers to bullet diameter. It is *not* the caliber or bore diameter before rifling. Caliber would be 9.1mm, and, yes, the parent 7.9x57mm *is* 7.9mm caliber. Can we make this more complicated? Sure! The 9.3x57mm Mannlicher mentioned awhile back was also called 9.3x56, 9.3x56.5, 9.5x56, 9.5x56.5 and 9.5x57! Its bore diameter (caliber) was 9.3mm; groove diameter 9.5mm. Thus, it should not fit 9.3x57mm Mauser

(Continued on page 82)

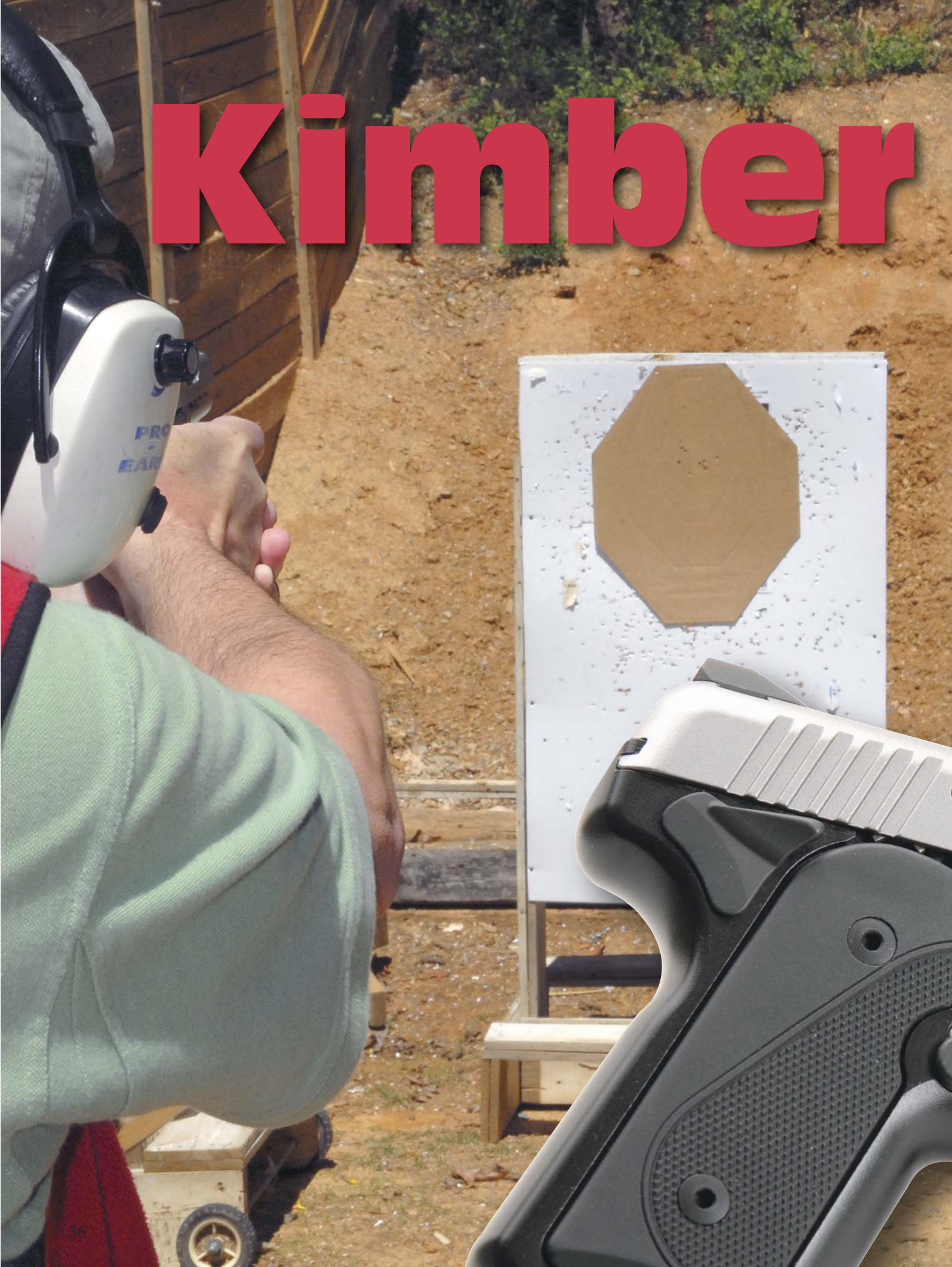
9.3x57mm Mauser



Cartridge Dimensions

A - Overall Length ----------3.189	**E** - Rim Diameter ----------.471
B - Case Length----------2.224	**F** - Head Diameter ----------.470
C - Length to Neck----------1.864	**G** - Shoulder Diameter ---------.433
D - Length to Shoulder-------1.805	**H** - Neck Diameter ----------.394
	I - Shoulder Angle ----------17°30'

Kimber



Solo

A New 9mm Micro-Compact!

Charles E. Petty

Perhaps we are in the age of the incredible shrinking gun. After all, virtually every handgun maker has offered a series of increasingly smaller pistols. Names often include terms like: *compact*, *sub-compact*, *mini* or *micro*. My science education kicks in, and I think of grams, milligrams (0.001), micrograms (0.0001) and, even though it might be an even bigger stretch, the next should be picograms (0.00001). Some bright marketing type will surely find a new superlative.

Many years ago I was told in confidence that Kimber was "thinking about" a smaller pistol, not on the 1911 format, but I didn't hear anything more. So it was a bit of a surprise when I was shown a Solo at the SHOT Show last January. It is the product of more than three years of development, and now I have one in my hands. It is surely one of the smallest 9mm pistols around. Someone else may be able to compare it with everything on the market and pronounce it "smallest," but not me, and that may be an exercise in futility anyhow, since some other company can shrink its offering by a millimeter or two and stake a new claim. Let's just say the Solo is small and certainly fits the "pocket pistol" format.

Any time we shrink a gun, there is a price to pay. I firmly believe that reliability is directly proportional to size, so the engineering challenge becomes more difficult and ammunition choices matter too. Kimber goes a bit further than most and issues very specific ammunition recommendations:

Solo pistols were designed from concept forward to operate with high pressure 9mm hollow point defense ammunition and bullet weights of 124-147 grains. Use of ammunition falling outside these parameters may cause malfunctions during feeding, extraction or ejection.

Recommended Ammunition:

- *Federal Hydra-shok JHP 124 or 147 grains*
- *Remington Golden Saber JHP 124 or 147 grains*
- *Hornady TAP HP 124 or 147 grains*

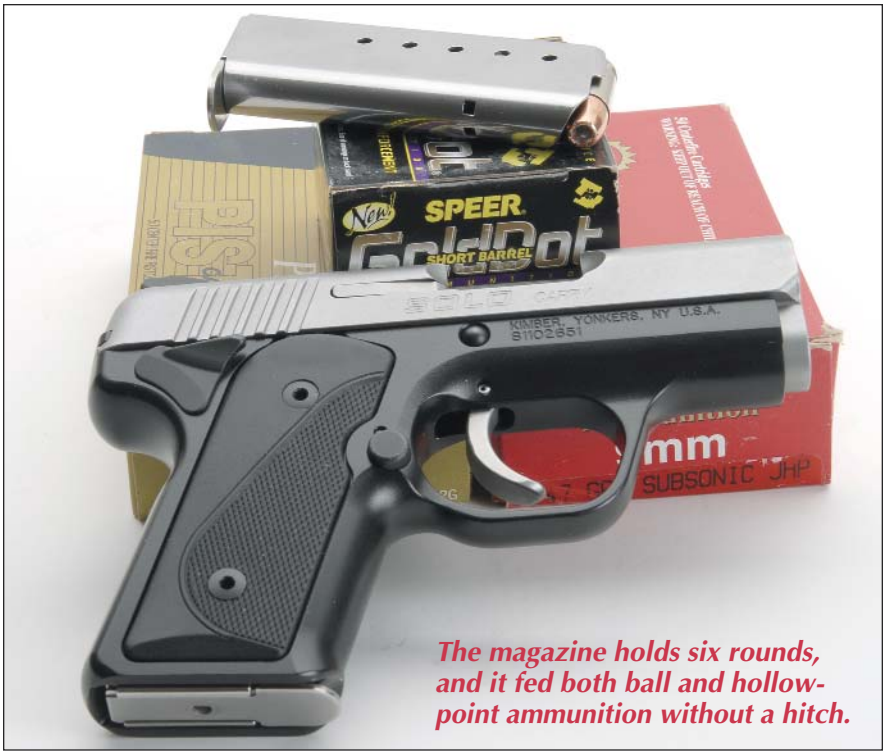
This is one of those things where you really have to read between the lines. We can be sure that Kimber has tested this twelve ways from Sunday and knows those loads are reliable for a defense pistol that *must* work. That doesn't mean there aren't plenty of other loads that will work too, so I guess

Facing page, a standard IPSC target works well for this type of testing. Left, the Solo has a black anodized alloy frame and stainless slide.

you could call it a starting point. When you shrink the firearm envelope, ammunition consistency can be critical to reliable operation. That's what Kimber is telling us.

That brings up another point. "The use of reloaded 'remanufactured,' handloaded or other nonstandard ammunition voids all warranties." But *gee*, guys, we're *Handloader*, so I guess we'll just have to pretend we didn't see that.

One of the things we can infer from Kimber's ammunition warning is that we probably won't have much luck with reduced loads, but I don't think we should interpret its use of "high pressure" ammunition as a mandate to use +P ammunition either. So in a way, we need a rather delicate balancing act. If the recoil energy is too low, the rather substantial recoil spring package will keep the slide from moving far – or fast – enough to eject the empty and pick up a fresh round; on the other side of the coin, excessive pressure levels translate to faster wear and tear on both gun and shooter. Kimber's recommendation does not include any of the lighter bullets that are popular with those who revere velocity. But bullet weight is a concern in terms of recoil energy, and many of the lower-priced loads use 115-grain bullets and aren't always consistent. These may be fine, but they need to be proven.



The magazine holds six rounds, and it fed both ball and hollow-point ammunition without a hitch.

I mentioned the recoil spring "package," and it is a compound arrangement of two springs. When you first retract the slide, it feels average, but about halfway back you run into the wall. That is where the slide contacts the second, very strong spring. From that point it takes considerably more energy to completely retract the slide to lock it open. At first it was quite stiff, but after 50 rounds or so, it was easier and seems to have reached a constant level. Kimber does recommend that it be replaced at 1,000-round intervals.

Following the rule of "no free lunches," any time we make a gun lighter, there's a price to pay in increased recoil; but everyone feels it differently, and there really isn't a good way to describe it. My view

The Solo is small and certainly fits the "pocket pistol" format.

Kimber offers a nice, compact holster to complement the size of the pistol.

Specifications: Kimber Solo

Mechanism type: recoil, locked breech
Material: alloy frame, stainless slide and barrel
Caliber: 9mm Luger
Overall length: 5.5 inches
Barrel length: 2.7 inches
Weight: 17 ounces
Magazine capacity: 6+1
Trigger: single-action striker fired, 7 pounds
Sights: fixed 3-dot
Grips: black synthetic
Price: $747
Manufacturer: Kimber Manufacturing
1 Lawton St.
Yonkers NY 10705
1-888-243-4522

Actual size is 40.6 mm

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BBB ACCREDITED BUSINESS

The barrel is aggressively relieved behind the muzzle to allow it to tip down enough to unlock. There is no separate barrel bushing, but the fit with the slide is very good.

has always involved two issues: Can I shoot it well enough to protect myself, and how bad does it hurt? For the Solo my answers are "yes," and "no," it doesn't hurt. But at the same time it probably isn't going to be a gun you want for a major blasting session. I think part of that will depend on *how* you shoot too. If you try leisurely paper punching, it won't take too many rounds to run out of *fun*. In a more tactical manner of draw and fire a couple of rounds, you can shoot more, but eventually it will get tiresome. The point is, the Solo is a member of a growing family of guns that are meant to be carried a lot and shot a little.

Field stripping the Solo is easy and requires no tools.

We always try to fit things into pigeonholes, and this one will be put in the pocket pistol spot, and it surely can be carried that way. It is nice and thin, but when I just stuck it in a pocket, it usually worked itself into a position where the magazine was sticking straight up. But Kimber has done a good thing and given holster makers a head start. Galco has two now, and I'm sure other makers have them on the way. A pocket holster would work too. By the time you see this, Crimson Trace should have LaserGrips, and night sights will be available.

Of course, everyone wants to know about accuracy, and as I've said before, trying to shoot groups with little guns is more a measure of the individual than the gun. As is my practice with this type of handgun, I run some simple defensive shooting drills. Starting at 5 yards and moving back and shooting as fast as practical, I'll keep backing up until the shots no longer stay within the "A" zone of an IPSC target. Well, out to 25 yards

Left, Tim Burke assisted with the testing, and no, the brass doesn't hit you in the face. Below, at longer ranges groups did open up, but the fliers weren't the gun's fault.

and beyond, that was no problem with only a couple of fliers that weren't the gun's fault.

Keeping in mind Kimber's ammunition comments, I've shot the little gun with a variety of loads not on its list and can report virtually no issues – the greatest being a few failures for the slide to lock back on the last round. I also shot a favorite plinking load of 3.8 grains of Titegroup with a 125-grain cast bullet that did just fine. I also have a box of miscellaneous handloads that accumulate over time, and all those I tried worked too. After reading the warnings, I was a bit worried, but those fears proved groundless. Regardless of the load, I have experienced no feed or function failures. My view on this is that I'll follow the suggestions for carry ammunition and shoot whatever I like for fun.

The design of the Solo doubtless makes use of the lessons learned from Kimber's short barrel 1911-style pistols in the recoil spring package and the forward portion of the barrel. It is deeply relieved – almost like a cone – to allow the barrel to tip enough to unlock. There is a single locking lug on top of the barrel that mates with one in the slide, and the bottom lug is reminiscent of the Browning Hi-Power design. The pistol is fully ambidextrous with a manual safety located roughly in the same position as the 1911 and a magazine release that can be pushed from either side.

The pistol is fully ambidextrous.

Field stripping is straightforward. There is a disassembly notch in the slide, and when it is aligned with the slide stop pin, the pin can be pushed out with finger pressure. Then you can ease the slide forward to its normal position. At this point you have to pull the trigger to release the striker and then the slide can come forward and off. (I find it wearisome to read a dozen times to make sure the gun is unloaded, so please do.) The recoil spring set is easily removed, and the only tricky part is that you must turn the barrel to one side or another as you lift it up so the hood can clear the slide. As always, reassemble in reverse order, but Kimber warns to be sure the slide stop engages a small spring on the frame. There is a nice picture in the instruction booklet to help.

So far the little Kimber has fired several hundred error-free rounds. I have often found that small pistols need a break-in period (Kimber says the Solo's is 24 rounds.), but that hasn't been the case here. Careful examination has shown no abnormal wear, and the only issue I had was that the sights needed a slight adjustment in windage. Only time will tell, but it looks like Kimber got it right.

CAST BULLET DESIGNS

Mike Venturino
Photos by Yvonne Venturino

Is there a more versatile cast bullet design for rifles and handguns than the age-old round-nose/flatpoint (RN/FP)? I don't think so. While it may not be the absolute best choice for some endeavors, it never seems to be a poor choice.

Consider this: In regard to handguns, the full wadcutter (WC) bullet has dominated bullseye target shooting for a century or more; and since Elmer Keith began writing about the semiwadcutter (SWC) for hunting at least four score years ago, that shape has been considered the best cast handgun hunting bullet. Yet both bullet types would or could be problematic in feeding through lever-action rifles and carbines or semiautomatic handguns or long guns. In other words, wadcutters and semiwadcutters are specialized. They are not versatile.

Now consider the RN/FP lead alloy bullet. Unless there are extenuating factors, they will feed through every type of repeating firearm ever put on the market – revolvers, pistols, leverguns, semiautomatics, bolt- and pump-action rifles and carbines. I've even run a considerable quantity through my World War II-vintage .45 ACP Thompson submachine gun. What about accuracy? It is my experience that RN/FP bullets, *with all other factors equal*, are inherently accurate.

The very first RN/FP cast bullet design I used back in the 1970s proved that to me, when used as part of a test project in an S&W Model 29 .44 Magnum (6½ inch). It was Lyman 42798 (now 427098), nominally 205 grains of Lyman No. 2 alloy formula and nominally meant for .44 WCF (.44-40). To my surprise they outshot Elmer Keith's Lyman 245-grain SWC (429421) and Ray Thompson's Lyman 250 SWC with gas check

(429244). Loading them very carefully, I was able to get some 50-yard, five-shot groups as small as 1.50 inches at velocities in the 1,400-fps range.

In regard to effectiveness on game, the proper design of an RN/FP can perform as well as SWCs. It's all in the meplat, the flat frontal area of the bullet. A small meplat causes an RN/FP to perform much like an ordinary roundnose on game – poorly. Back in the spring of 1976, I was house-bound for awhile due to a severe knee injury. To get me out for a bit on a nice day in May, a friend loaded me and my crutches in his pickup to go gopher (actually ground squirrel) shooting. Having a rancher's permission, we were able to drive around his pastures and shoot from the truck's windows. Each of us took along a couple of Colt SAAs. Mine were a .45 Colt and a .357 Magnum. Bullets for the big bore were cast in Lyman's mould 454190, a 250-grain RN/FP with a very small meplat of .20 inch. Bullets for the smallbore were from Lyman mould 358477, a 150-grain SWC. Both bullets were loaded to give about 800 fps from their respective Colts.

Shooting at ranges from 10 feet to about 25 yards, I was negatively amazed by the .45's performance. When I hit one of those little varmints solidly with that big .45 bullet, it often would hump up momentarily and then run for its hole. On the other hand, the .357's

Roundnose/Flatpoint

This assortment of RN/FP bullets and loaded rounds are some Mike uses regularly in his handloading.

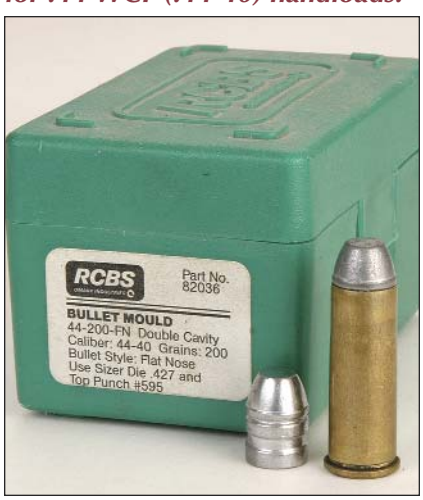
CAST BULLET DESIGNS

Above, Mike can handload to feed seven guns with the RCBS 40-180-CAS mould, including the (1) Winchester Model 1873 .38 WCF, (2) Winchester Model 1892 .38 WCF and (3) Winchester Model 1892 saddle ring carbine .38 WCF. Handguns include (4) Colt New Service .38 WCF, (5) Colt SAA .38 WCF, (6) Kimber Model 1911 .40 S&W and (7) Colt SAA .38 WCF. Right, RCBS mould 40-180-CAS works well for .38 WCF (.38-40) and .40 S&W.

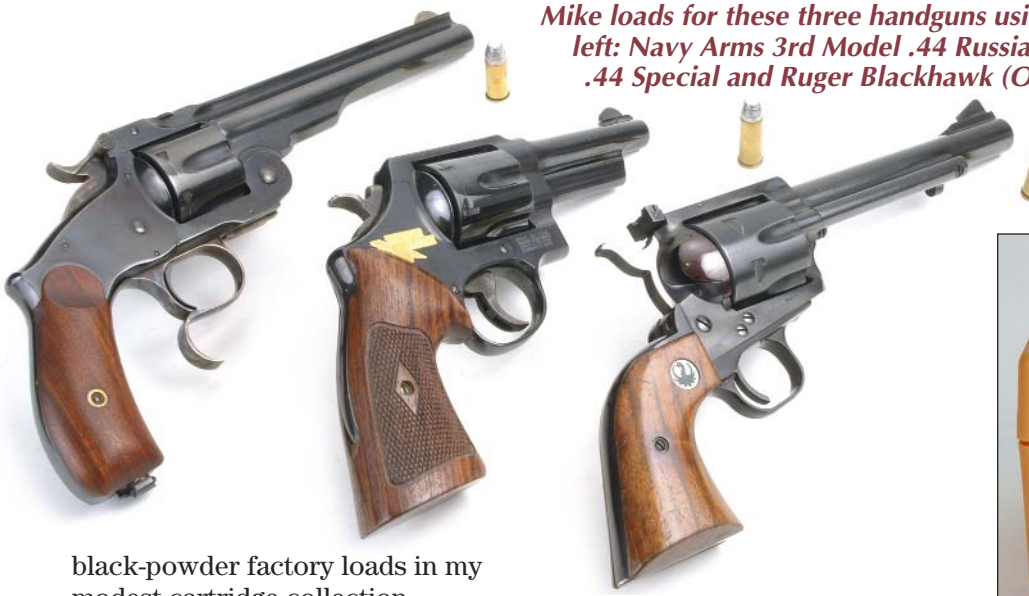
SWCs (using .38 Special loads) mostly caused them to fold up on the spot. That was a lesson learned: If using a RN/FP on something alive, then pick one with a wide meplat.

RN/FP bullets are just about as old as metallic cartridges. By my research, the first true RN/FP as we know it today (with the bullet's full diameter sitting inside the case and with grease grooves covered) came with Winchester's introduction of its first centerfire rifle cartridge. That was the .44 WCF (.44-40). That bullet was also 200 grains with a gentle curving ogive and small meplat of about .25 inch, as measured on some old

For about 25 years, Mike has preferred this RCBS mould 44-200-FN for .44 WCF (.44-40) handloads.



Mike considers these two moulds as variations of the same theme, i.e., an RN/FP that will feed well from leverguns and also be safe in their tubular magazines. Lyman's version is plain base; RCBS's is gas check.



Mike loads for these three handguns using Lyman mould 429667. From left: Navy Arms 3rd Model .44 Russian, Smith & Wesson Model 21-4 .44 Special and Ruger Blackhawk (Old Model) .44 Magnum. Below, this relatively new Lyman .44 mould is Mike's preference for loading .44 Russian, .44 Special and .44 Magnum.

black-powder factory loads in my modest cartridge collection.

Without having documentation to prove it, I suspect at that point in history the purpose of the RN/FP had nothing to do with effectiveness on game. In those early days of metallic cartridges, little consideration was given to bullet performance on animals. Essentially, the idea was to just plunk one in its vitals with any shape or temper of bullet and then be prepared to track it to its final resting place.

The origin of the RN/FP was due to safety concerns in tubular magazines. As evidence of that, take a look at old cartridges or old cartridge drawings. If a cartridge was intended for a repeating *centerfire* rifle or carbine, its factory loads contained RN/FP bullets. Otherwise cartridges developed exclusively for revolvers, single-shot rifles or *rimfire* repeating rifles mostly carried roundnose bullets or conical bullets with a very small meplat. Good examples of both varieties respectively would be in early .45 and .50 Government loads. Some shooters pooh-pooh the danger of cartridges igniting in levergun magazine tubes. True, it's a rare enough happening today, but one must think about it in the terms of an earlier era. Primers were brand-new items, certainly not as refined or as reliable in all respects as ours today.

There is one important documented example of magazine tube explosions. In 1882 Marlin submitted its brand-new Model 1881 levergun to the U.S. Army's Ordnance Board for testing. It was chambered for .45 Government (.45-70). At that time the U.S. Army's standard load used a 405-grain roundnose bullet swaged of 1-to-14 (tin/lead) temper over 70 grains of black powder. In firing tests the new Marlin suffered two magazine tube explosions and was dropped from further consideration. (That incident caused the advent of a cast bullet design that is still popular. We'll discuss it further on.)

As long as black powder and lead alloy bullets reigned as propellant and projectile for metallic cartridge ammunition, the RN/FP

Mike loads for these three handguns using the same RCBS 45-230-CAS mould. From left: Les Baer Model 1911 .45 ACP, Smith & Wesson Model 22-4 (aka M1917) .45 ACP/.45 Auto-Rim and U.S. Fire Arms "Custer Battlefield" .45 Colt (also fires .45 S&W Schofield). Below, RCBS mould 45-230-CAS works well for handloading .45 ACP, .45 Auto-Rim, .45 S&W Schofield and .45 Colt.

CAST BULLET DESIGNS

From left: .45-caliber, 230-grain full wadcutter (Redding/SAECO 453); .44-caliber, 250-grain semiwadcutter (RCBS 44-250-K); .44-caliber, 200-grain roundnose (Hoch custom mould); and .45-caliber, 255-grain RN/FP (Redding/SAECO 955).

was arguably the most common bullet design. After smokeless powders and jacketed bullets became the norm, lead alloy RN/FP bullets gradually became extinct in factory ammunition. For many decades, if a shooter wanted lead alloy RN/FP bullets, he had to pour them himself, and even then factory-made moulds for such bullet shapes were not all that common or so well thought out. Some of the old designs presented significant problems for smokeless powder handloaders. I experienced such problems.

In the mid-1980s, for one of the first big cowboy matches to which I was invited, it was my desire to couple a Colt SAA .38 WCF (.38-40) with a Winchester Model 1873 rifle of the same chambering. Before that, all my .38 WCF reloading experience had been with revolvers. The only RN/FP bullet design for that caliber in my mould assortment was Lyman's age-old 40143 (now 401043). It essentially is Lyman's 427098 reduced in size.

Loaded over a now unremembered powder charge to give about 800 fps, it shot nicely in the revolver, as I had come to expect of RN/FP bullets. It likewise shot accurately from a newly acquired '73 Winchester rifle, except I made one major mistake. It was only fired during group shooting and sighting-in as a single shot, or at most with five rounds in the magazine.

After traveling more than 1,000 miles to the big match, my problems started with the very first pull of the trigger. That's when I heard a prolonged *plop-plop-plop* inside the magazine tube. After which the levergun was completely non-functional. Every bullet in the magazine's remaining nine rounds had "popped" back into their cases.

Favored Handloads with RN/FP Bullets

bullet (*grains*)	cartridge	powder	charge (*grains*)	primer	velocity (*fps*)	firearm	barrel length (*inches*)
175 RCBS 40-180-CM* (sized .401 inch)	.40 S&W	Bullseye	4.6	WSP	918	Kimber 1911	4¼
185 RCBS 40-180 CM (sized .401 inch)	.38 WCF	Trail Boss	5.4	WLP	756	Colt SAA	5½
		HP-38	6.8		1,181	Winchester '92	24
		GOEX FFg	34.0	CCI 350	1,280	Winchester '73	24
250 Lyman 429667 (sized .430 inch)	.44 Russian	Titegroup	3.8	WLP	743	Navy Arms 3rd	7
	.44 Special	W-231	5.5		732	S&W M21-4	4
	.44 Magnum	Unique	8.0		944	Ruger Blackhawk	6½
			8.0		1,244	Marlin M1894	24
214 RCBS 44-200-FN (sized .428 inch)	.44-40 WCF	W-231	6.8	WLP	895	Colt SAA	7½
		AA-5744	17.0		1,210	Winchester M '73	30
		GOEX FFFg	34.0	CCI 350	1,225	Cimarron M '73	24
224 RCBS 45-230-CM* (sized .451 inch)	.45 ACP	W-231	5.3	WLP	819	Colt 1911 A1	–
233 RCBS 45-230-CM (sized .452 inch)	.45 Auto-Rim	Red Dot	4.7	WLP	843	S&W M22-4	–
	.45 S&W**	Titegroup	5.0		729	S&W Schofield	7
	.45 Colt**	Red Dot	6.2		736	U.S. F.A. SA	4¾
410 RCBS 45-405-FN (sized .459 inch)	.45-70	AA-5744	28.0	CCI 200	1,389	Winchester M1886	26
	.45-90 WCF		33.0		1,455		
420 Lyman 457193 (sized .459 inch)	.45-70	Swiss 1½ Fg	63.0	Fed. 215	1,290	Shiloh '74 Sharps	30

* Linotype used; all others were cast of 1-to-20 alloy.

** These cartridges were sized .454 inch.

Notes: All chronograph notes are for five shots taken with chronograph start screen at approximately 6 feet. Brass for .38 WCF, .44 Russian, .44 Special, .44 Magnum, .44 WCF, .45 ACP, .45 S&W, .45 Colt, .45-70 and .45-90 smokeless loads was Starline. Brass for .38 WCF, .44 WCF and .45-70 black-powder loads was Winchester. Brass for .45 Auto-Rim was Remington. All bullets lubed with SPG.

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CAST BULLET DESIGNS

You see, Lyman bullet 40143 (and Lyman 427098) had been developed during the black-powder era. It is a 175-grain RN/FP with two grease grooves but no crimping groove. It was meant for seating on top of a full case of propellant and with a crimp applied over the ogive. Crimping over the ogive with smokeless powder loads might keep the bullet from moving forward during a revolver's recoil, but it does nothing to keep recoil, coupled with the magazine's spring pressure, from pushing every bullet in the tube down into its partially filled case. Evidently there wasn't enough pressure to cause that problem at home with only five rounds in the magazine, but double the number and it sure-

In the early days of metallic cartridges, the meplat of RN/FP bullets was just wide enough to cover the primer of the round ahead of it in a tubular magazine.

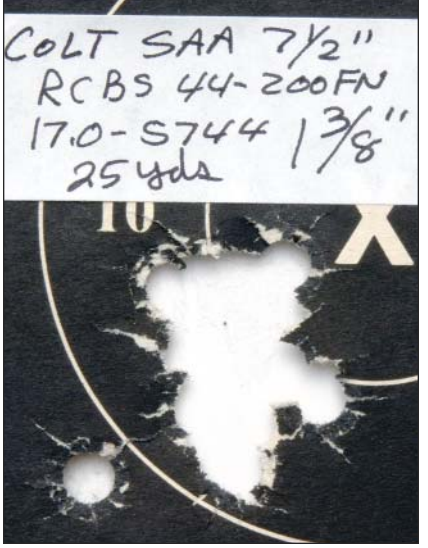
enough happened. What about just crimping in the top lube groove of 401043? That's fine for revolvers but makes overall cartridge length too long for a '73 Winchester.

I was far from alone in regard to RN/FP bullet problems, but as always, if a market is created, someone will fill it. With the growth spurt of cowboy competition that quickly began to happen. By about 1987 a fellow whose name I cannot recall had the ear of someone at RCBS. The end result of their collaboration was RCBS mould 44-200-FN, a 200-grain RN/FP with one big improvement. There is a single, wide grease groove and then a crimping groove located at the precise point so that when properly seated in .44 WCF (.44-40) cases overall cartridge length is 1.575 inches. That is perfect for functioning in all repeating long guns of that caliber. I credit that bullet design with turning me into, and keeping me still, an avid fan of the .44 WCF. I have used it on game up to the size of deer, and I have seen no sign that it gives up anything to SWCs. When handloading .44 WCF for my own purposes (as opposed to writing articles), it has been the only bullet used for nearly 25 years.

Eventually all the bullet mould makers got on the bandwagon, along with custom bullet casting operations. Nowadays RN/FP bullet designs are far too numerous to detail here. Instead I'll cover some with which I've had the best experiences and experienced the most versatility.

In respect to handgun-size cartridges, I feel that another RCBS mould is at the top of the heap. That is 45-230-CAS (cowboy mould) nominally for a 230-grain bullet with one big grease groove and properly placed crimping groove. Somebody at RCBS was thinking when he decided on 230 grains for this design. Most other .45-caliber handgun RN/FP bullets weigh at least 250 grains, making them too heavy for any cartridge besides .45 Colt. (Redding/SAECO's 954 is also rated at 230 grains, but from 1-to-20 (tin/lead) alloy, my mould drops them weighing 240 grains.) From my RCBS 45-230-CAS mould, that same alloy results in 233-grain bullets or 224 grains when poured of Linotype. One or the other alloy is ideal for .45 ACP, .45 Auto-Rim, .45 S&W Schofield or .45 Colt, of course, sized .454, .452 or .451 inch as needed.

When first viewing RCBS 45-230-CAS, one gets the impression that it is far more a flatpoint than a



Left, Mike considers RN/FP bullets to be as inherently accurate as any other design, all other factors being equal. This 50-yard group was fired with a Cimarron Model 1873 .44 WCF rifle. Right, a Colt SAA .44 WCF fired this group at 25 yards from a machine rest.

roundnose. Its meplat is .40 inch wide, the broadest of any RN/FP I know. One cannot help wondering if feeding problems would arise with repeating rifles or semiautomatic pistols. For me, there have been none, even to the point, as said earlier, of rattling them through a full-auto "Tommy-gun."

While on the subject of RCBS RN/FP bullet designs, its 40-180-CAS also rates high for versatility. It is RCBS's offering for .38 WCF (.38-40), which, of course, actually takes .40-caliber bullets. Again my usage of it has spilled over from revolvers and leverguns to semiauto pistols. It is also suitable for .40 S&W and 10mm Auto. Again, it gives superb accuracy and complete reliability. Some early Colt SAAs might perform better with bullets as large as .403 inch, but my two of 1990's manufacture, plus an early twentieth-century New Service, three Winchester leverguns and a Kimber .40 S&W 1911 all do well with .401-inch sizing diameter.

Although no other bullet design has tempted me away from the RCBS mould for .44 WCF, Lyman's RN/FP 429667 is my preference for .44 Russian, .44 Special and .44 Magnum. It is nominally 240 grains of Lyman's No. 2 alloy, but from the 1-20 blend that I prefer, as-cast weight is 250 grains. Among some older readers, it probably seems sacrilege to not use Keith-type SWCs in those latter two cartridges. I don't anymore. Lyman's 429667 is far more versatile. With a meplat of about .35 inch it is effective on tissue. Plus cartridges

(Continued on page 83)

Handloading with Accurate

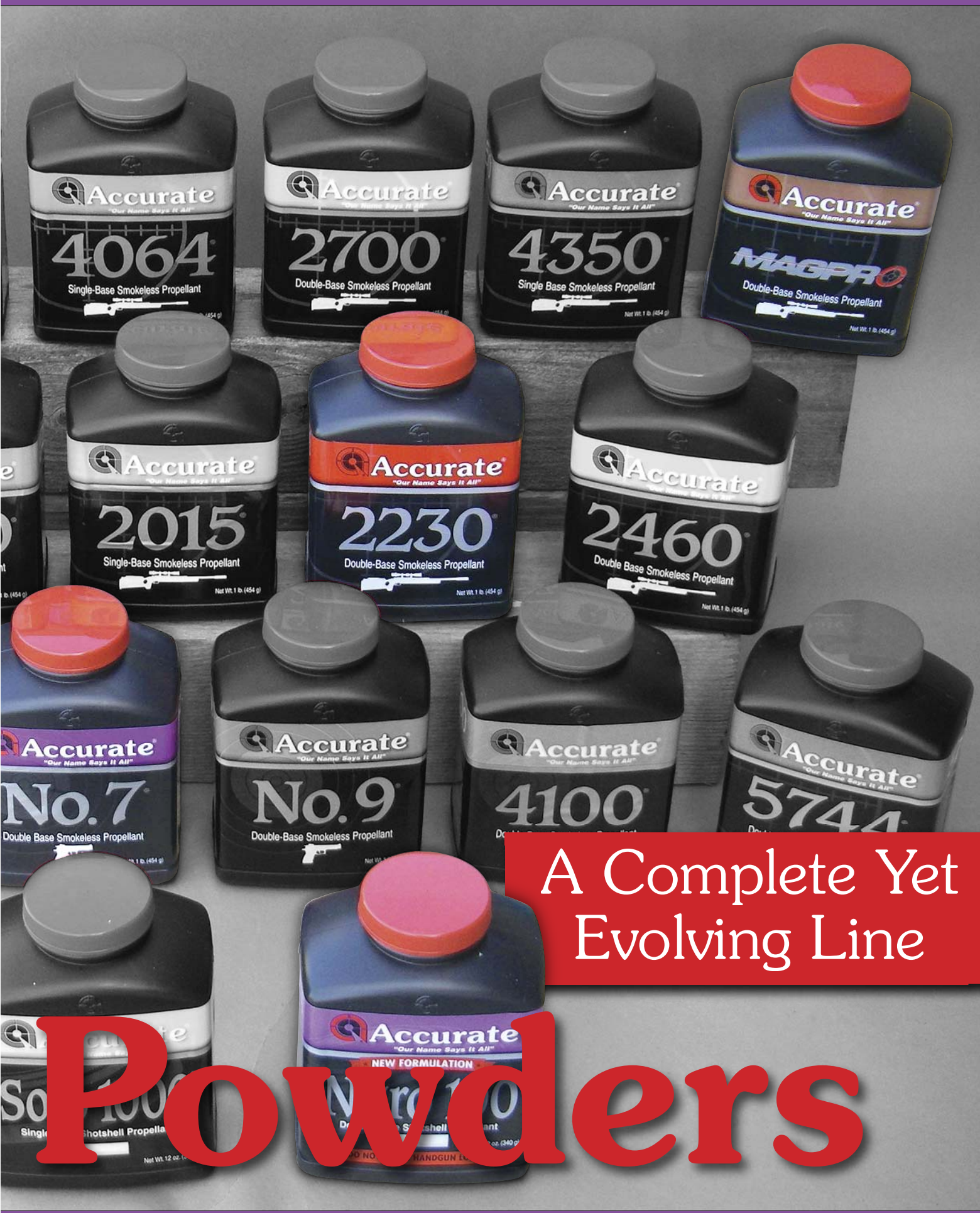
Brian Pearce

There is very little information on the history of Accurate Arms Co., except that it started as a custom gun shop in Chicago in 1946 and by 1976 began selling surplus U.S. powders. By 1983, under the direction of John Sondae, the company relocated to McEwen, Tennessee, built a ballistics lab and commenced selling powders in quantity to dealers.

While some of its powders were surplus from various militaries around the world, others were newly manufactured and consisted of proven recipes. Regardless, they came in generic, white containers, were offered at comparatively attractive prices and were well accepted by handloaders, particularly those who wanted to save money.

On the other hand, because Accurate Arms powders were produced by various manufacturing plants around the world, consistency was often less than outstanding, and sometimes they didn't shoot the very best. Shortly after their introduction, I tried several Accurate Arms powders, both rifle and handgun, and found them generally a good product, but lot-to-lot consis-

Western Powders purchased Accurate Arms in 2004, then set out to improve the overall quality. Currently there are 19 powders and more on the way.



A Complete Yet Evolving Line

Powders

Accurate Powders

Right, Accurate handgun propellants are spherical and offer precise metering qualities. AA-2 is the fastest burning while AA-4100 is the slowest. Below, most of the Accurate powders are spherical, but these five are extruded.

tency needed improvement. In extreme instances load data that was safe and gave reasonable accuracy and velocity performance with one lot number of powder failed to produce the same results with the next batch.

Over the next couple of decades, Accurate Arms evolved into a credible company that improved its overall product quality. The *Accurate Smokeless Powder Loading Guide Number One* was published in 1994, with *Number Two* appearing in 2000.

In 2004 Accurate Arms Company was purchased by Western Powders, Inc.

In 2004 Accurate Arms Company was purchased by Western Powders, Inc., located in Miles City, Montana. Most will be familiar with Western Powders, the owner of the Ramshot line of powders that are renowned for their near-perfect metering qualities, accuracy, lot-to-lot consistency and overall outstanding quality. It also operates a state-of-the-art ballistics lab where data is developed for the U.S. military and ammunition companies.

The first thing Doug Phair, owner of Western Powders, set out to accomplish was to tighten quality control of the entire Accurate product line. In many instances this meant the producer or supplier of a given powder had to be changed. Today Accurate powders are primarily produced in Canada (extruded powders) with spherical powders being manufactured in the U.S. and Belgium. More than a dozen ammunition companies, including major U.S. companies, use Accurate powders in rifle and handgun factory ammunition. They are also present in select U.S. military match, sniper and special purpose combat loads, where performance is everything.

After Western Powders made the above changes and improvements, I tried all of its rifle and handgun powders, finding them to be modern in every respect. They are clean burning, accurate with low extreme spreads and offer top performance and velocities in many cartridges. Today there are 19 propellants under the Accurate brand, and others are in development.

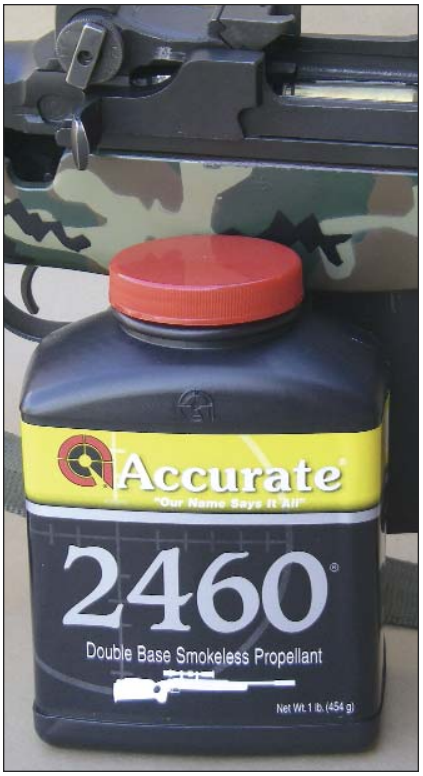
Flake powders usually consist of round disks and are primarily found in shotgun powders; they are also suitable for many handgun cartridges. At this time, the only flake powder offered by Accurate is Solo 1000. Flake powder is generally designed for low pressure and offers easy ignition, and although its metering qualities are not especially outstanding, it can still give excellent accuracy with low extreme spreads.

Spherical powders, most commonly known as ball powders, are not always round, as they are sometimes flattened to control burn rate. They come in different sizes and can have burn rates that range from extremely fast for handgun loads, such as Accurate No. 2, or can be very slow for overbore magnum rifle cartridges, such as Accurate MagPro. In the early years of ball powder devel-

Nitro 100 and Solo 1000 are shotgun powders and were among the first that offered clean-burning performance.

Accurate 5744 is a very fast burning extruded propellant. It is excellent for handloading most black powder rifle cartridges from the late 1800s, such as this reproduction Winchester Model 1876 .45-75 WCF.

opment, it often took a back seat to extruded powders in terms of accuracy and overall performance. Ball powders have been continually improved, with today's versions holding benchrest records, and they appear regularly in the winner's circle of many rifle and handgun matches. One advantage of ball powders is their easy, accurate metering qualities, which speeds the convenience of



Accurate 2460 is popular with users of M1A/M14 rifles chambered in .308 Winchester, as its burn rate is within the threshold for reliable cycling.

"throwing" charges from a powder measure into the case, rather than weighing each charge. High-volume handloaders who use progressive presses, as well as major ammunition companies using high-speed automated equipment, like-

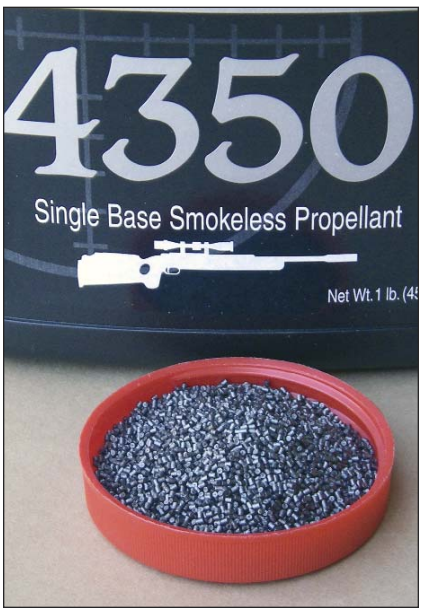
Accurate 2520 is a ball powder that delivers outstanding accuracy in .308 Winchester "match" loads.

wise often find favor with spherical powders.

Cylindrical powders are log- or stick-shaped. They are also known as "extruded," which refers to the process by which they are manufactured, being extruded through holes while still in wet form. They can vary considerably in size, length and burn rate. Quality extruded powders deliver accuracy and performance, but due to their shape, they often fail to meter accurately, and precision-minded handloaders have traditionally weighed each charge. Some savvy manufacturers, such as those associated with the Accurate line, have shortened the length of the "sticks," allowing better metering.

Accurate 2230 is the most popular propellant. Its burn rate is ideal in the .223 Remington.

Accurate 4350 is an extruded, short-cut powder that has become popular among handloaders.



AA-2 is fast burning, making it ideal for light or target handgun loads, such as the .38 Special with wadcutters.

Accurate Powders

Shotgun Powders

Nitro 100

This double-base, flattened ball powder developed for light trap and skeet 12-gauge loads is clean burning and insensitive to temperature changes. In the past it was suggested for low-pressure pistol and revolver cartridges, but with the chemistry and burn rate of the current product, Western Powders is no longer recommending it for those applications, at least until further pressure testing can be conducted.

Solo 1000

A fast-burning, single-base, flake powder developed primarily for shotguns, Solo 1000 was originally formulated as a modern, clean-burning powder and was something of a pioneer in this regard. It also serves in select handgun cartridges such as the 9mm, .45 ACP and in light cowboy-action loads.

Handgun Powders

Accurate No. 2

This is Accurate's fastest burning pistol powder that is ideal for low-pressure revolver and pistol cartridges such as the .38 Special, .44 Special, .45 Colt and others. It also works well in the .45 ACP and similar cartridges. It is a double-base, spherical powder that meters with near perfection and offers low extreme spreads. It is slightly bulkier than most other powders with a similar burn rate, which helps to fill the case, and it is not position sensitive, which is especially important in black-powder cartridges that have large case capacities, such as the .45 Colt.

Above left, this Savage Model 10 .223 Remington stoked with Nosler 55-grain Ballistic Tips and 24.5 grains of AA-2230 powder offers fine accuracy potential. Right, a custom Colt-pattern SAA Flattop Target .44 Special produced this 25-yard group using 9.3 grains of AA-5 with the 250-grain Lyman/Keith cast bullet 42921.

Accurate No. 5

One of Accurate's most popular handgun propellants, No. 5 has a slightly slower burn rate than Alliant's long-time popular Unique and is generally ideal in the same applications. It is a great choice for reduced or midrange loads in magnum revolver cartridges, such as the .357, .41 and .44 Magnums and the .454 Casull, and it works equally well in .38 Special, .44 Special, .45 ACP/Auto Rim and .45 Colt. It is a double-base, spherical propellant that offers precise metering and produces low extreme spreads.

Accurate No. 7

This double-base, spherical powder offers notable performance in many handgun cartridges, but it should not be used in low-pressure applications. It thrives on full-power 9mm Luger loads (for which it was originally developed), 10mm Auto and magnum revolver cartridges wherein something less than full-power velocities are desired.

Accurate No. 9

A double-base, spherical powder,

Accurate Powder Loads

caliber	bullet (*grains*)	charge (*grains*)	velocity (*fps*)	comments
Accurate No. 2:				
.38 Special	148 Speer hollowbase wadcutter	3.0	800	
.45 ACP	200 Hornady FMJ-C/T	6.5	960	
.45 Colt	250 Oregon Trail RNFP	6.0	730	
Accurate No. 5:				
.38 Special	158 RCBS 38-150-SWC	6.2	940	
.45 Colt	255 Lyman 454190	10.3	860	
Accurate No. 7:				
.44 Magnum	250 Lyman 429421	17.0	1,260+	
10mm Auto	180 Speer Gold Dot HP	12.0	1,300	
Accurate No. 9:				
.357 Magnum	160 Lyman 358156	14.9	1,300	
.44 Magnum	240 Speer Gold Dot HP	21.0	1,300	
Accurate 4100:				
.44 Magnum	240 Hornady XTP HP	21.5	1,375	
.22 Hornet	40 Sierra	9.2	2,670	
Accurate 5744:				
.45-60 WCF	292 Lyman 457191	27.0	1,387	
.30-06	150 Sierra spitzer	29.0	2,100	
Accurate 1680:				
.22 Hornet	40 Sierra	14.2	2,800	24-inch barrel
Accurate 2200:				
.223 Remington	36 Barnes Varmint Grenade	26.5	3,900	24-inch barrel
Accurate 2015:				
.223 Remington	50 Hornady V-MAX	24.0	3,250	
.45-70	400 Speer FNSP	52.0	1,850	22-inch barrel; 28,000 CUP
Accurate 2230:				
.223 Remington	55 Speer spitzer	25.0	3,000+	24-inch barrel
|	55 Nosler Ballistic Tip	25.0	3,000+	24-inch barrel
.30-30 Winchester	150 Sierra FN	31.7 to 32.0	2,225	20-inch barrel
Accurate 2460:				
.308 Winchester	150 Hornady FMJ-BT Match	45.0	2,800	
.223 Remington	60 Nosler Partition	23.5	3,000	22-inch barrel
Accurate 2495:				
.30-30 Winchester	150 Speer FN	31.2	2,200	
.308 Winchester	150 Nosler Partition	46.5	2,800+	
Accurate 2520:				
.308 Winchester	175 Nosler Custom HP-BT	44.5	–	
Accurate 4064:				
.30-06	165 Barnes TSX	52.0	2,800	22-inch barrel
Accurate 2700:				
.30-06	165 Nosler Partition	56.0	2,830	22-inch barrel
Accurate 4350:				
.270 Winchester	140 Nosler Partition	52.5	3,000	24-inch barrel
Accurate Mag Pro:				
.300 WSM	180 Nosler Partition	76.0	3,000+	24-inch barrel
7mm Remington Magnum	160 Sierra spitzer	69.0	3,050+	24-inch barrel

Be Alert – Publisher cannot accept responsibility for errors in published load data.

No. 9 is an excellent choice for traditional magnum revolver cartridges, especially when loaded with standard weight bullets. Since Western Powders improved and tightened quality, it has become one of my favorite powders in .357, .41 and .44 Magnums. It offers low muzzle flash and is clean burning. It does not require a magnum primer for proper ignition.

(Note that AA-2, AA-5, AA-7 and AA-9 do not require a magnum primer, and neither are they suggested, to obtain correct ignition. All the above listed loads are used in conjunction with a standard, large or small, pistol primer. If a magnum primer is used, the maximum charges should be reduced.)

Accurate 4100

The slowest burn rate handgun powder in the Accurate line, 4100 is ideal when matched to magnum revolver cartridges, giving especially notable performance with heavyweight bullets and good velocity and accuracy with standard weight bullets. It likewise performs well in .22 Hornet, .218 Bee and similar cartridges. Being a double-base, spherical powder, metering is excellent.

Rifle Powders

Accurate 5744

This is an extruded, short-cut, double-base powder that has some rather unusual applications. It has found favor in the big Sharps and late 1800's black-powder-era rifle cartridges and serves as a good propellant for reduced rifle loads in modern bottleneck cartridges, such as the .270 Winchester and .30-06. Many report good results in magnum revolver cartridges, and it is also popular with cast bullet shooters who use a variety of modern and vintage cartridges.

Accurate 1680

A double-base, spherical powder, 1680 is best in small-capacity cartridges such as the .22 Hornet, .218 Bee, .221 Fireball and .222 Remington, the latter primarily with 40- to 50-grain bullets. It also works well in large-capacity handgun cartridges, such as the .460 S&W.

Accurate 2200

This powder was added to the Accurate product line in 2004. It is a double-base, spherical powder that offers astonishing performance in .223 Remington when stoked with lightweight 30- and 36-grain bullets that can reach 3,900 and 4,200 fps, respectively.

Accurate 2015

A single-base, extruded propellant, Accurate 2015 has many applications. It has become popular with benchrest competitors who use the PPC and BR cartridges. It likewise gives good accuracy and a lower muzzle report in the .223 Remington and similar cartridges. It is near-perfect in the .30-30 Winchester and offers top-notch performance at pressure levels that range from 20,000 psi to 43,500 psi in the .45-70. It is likewise a top

Accurate.

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Accurate Powders

choice for .444 Marlin handloads and similar straight-walled rifle cartridges. Accuracy is notable, and being a small-grained powder, it meters well.

Accurate 2230

Accurate's top-selling rifle powder, 2230 was designed specifically for the .223 Remington, thus its name. It is a double-base, spherical powder that meters accurately. Its popularity among high-volume varmint and match shooters is widespread, and it is used by several companies in their flagship ammunition. Handloaders will also discover it offers excellent accuracy in .30-30 Winchester, .444 Marlin, .45-70 and similar cartridges.

Accurate 2460

A double-base, spherical powder that is popular with a variety of bullet weights in the .223 Remington, AA-2460 also performs well in the .308 Winchester with 147- to 165-grain bullets. It has a reputation for accuracy and has become popular in competition circles. Its burn rate makes it suitable for the threshold limits of the M1A/M14 service rifles.

Accurate 2495

A single-base, extruded propellant, AA-2495 is similar to 4895, but it is super short cut and meters smoothly. Its burn rate makes it suitable for handloading many cartridges but offers notable performance in the .223 Remington (especially with heavy bullets), .30-30 Winchester, .308 Winchester and other similar cartridges.

Accurate 2520

This is another double-base, spherical powder that delivers outstanding accuracy, low extreme spreads and is developing a great reputation in competition circles. It is at its best in medium-capacity cartridges such as the .308 Winchester but also works well in many applications from .223 Remington to .45-70.

In a 30-inch barreled Savage Model 12F/TR .308 Winchester, a handload using NoslerCustom 175-grain Competition hollow-point boat-tails produced a 10-shot group that measured just slightly over .75 inch at 300 yards. (See table for load data.)

Accurate 4064

This single-base, extruded powder is super short cut, loads easily and yields superb accuracy. It works admirably in the .30-06 with several bullet weights and with heavy bullet loads in the .308 Winchester. One major ammunition company supplies our military with .308 Winchester sniper loads

containing a 190-grain Sierra bullet pushed with AA-4064 powder, which is yielding outstanding accuracy and reliability. In developing loads for several cartridges, it has demonstrated excellent accuracy, which many match-winning shooters have discovered.

Accurate 2700

A double-base, spherical propellant, 2700 is slightly faster burning than 4350. This is the same powder with fully interchangeable data as Winchester W-760 and Hodgdon H-414. (They all come from the same manufacturer.) It is one of the ideal powders for the .30-06, and with accurate metering, charges can be thrown from a powder measure.

Accurate 4350

A single-base, extruded powder, AA-4350 is super short cut for easier measuring or metering. It's a top choice in popular hunting cartridges such as the .243 Winchester, .25-06 Remington, .270 Winchester, .30-06, .300 WSM and .375 H&H Magnum.

Accurate 3100

A single-base, extruded powder that shares a similar burn rate as 4831, AA-3100 is suitable for most popular magnum cartridges. At this point Western Powders is still working to get the new, improved formula correct, and until that happens it is temporarily discontinued.

MagPro

This double-base, spherical powder is the slowest burning rifle powder in the Accurate lineup and is relatively new. It is best suited to the .270 Winchester, the various 7mm and .30-caliber magnums and similar overbore cartridges. It has established a track record for accuracy and is expected to become very popular.

Accurate powders have something for every shooter, and there are few if any "holes" in its product line, but there are additional items in the developmental stage that will prove interesting.

Not Just

Terry Wieland

Shooters of black-powder shotshells in this country owe a debt of gratitude to several generations of trapshooters whose quirks have kept alive a technology that's been abandoned everywhere else in America: The paper shotshell.

Federal Cartridge is the last major ammunition maker to produce paper hulls, and it does so purely for the trapshooting fraternity. As a result, once-fired paper hulls of the very best quality are freely available to those of us who want to reload them with black powder and shoot them in our older guns.

On strictly economic grounds, there is absolutely no excuse for Federal to continue to make Gold Medal Paper. It's expensive, time-consuming and labor-intensive compared to plastic. And, since the price has to be kept at least competitive with other top-quality trap loads, Federal doesn't make much money at it. So why bother? Drew Goodlin, director of strategic product development at Federal, says the reason is simple: "There's a demand. Some trapshooters love them, and believe they get better scores, and are willing to pay for them."

Trapshooters are, in some ways, the most superstitious and finicky of shooters, but they are also the least sentimental. Unless a gun and load breaks clays, they won't use it. So there is no nonsense about the romance, or the history, or the feel of a paper shell, or the aroma of the smoke, as there would be with people like me, for example.

The folks at Federal long ago stopped trying to figure out why some top trapshooters – and these guys are among the cream of the crop – demand paper; instead, they simply settled down to make sure they could still supply the demand.

As with so many other things in modern life, the ascendancy of plastic hulls is almost completely economic, although ease of loading and reloading plays a part. The manufacture of a plastic hull can be described very simply. There is a long line of machinery. Large containers of plastic pellets are poured into a big hopper at one end, a few buttons are pushed, the machines rumble into operation and about 20 minutes later perfectly formed plastic hulls, ready for loading, pour out the other end.

Now compare that with the 10-day period required to make a paper hull, from start to finish. That's right, *ten days!* For most of this time, the hulls are sitting

Federal Gold Medal Paper tubes, waxed and ready for the next step.

quietly in a warm, climate-controlled room, doing nothing but curing. But we are getting ahead of ourselves.

Paper hulls are made in a cluster of old buildings on the Federal grounds in Anoka, Minnesota, just outside Minneapolis. The buildings are red brick, identified by the year they were constructed. Building number 1922 is the home of Federal Gold Medal Paper. That was a year in which the Grand was dominated by the Flues-model Ithaca, which gives you some idea.

A paper hull begins with a roll of specially made paper, about three feet across, inked red on one side.

How Federal keeps a tradition alive.

on Paper

Not Just on Paper

Paper is the raw material. This strip is 11 inches wide but comes from the paper mill in rolls a yard across.

How special is it? There is only one paper mill left in America that produces such paper, and it stays in business purely to supply Federal Cartridge.

When the tubes come out of the rolling machine, they are set aside to dry.

The paper is cut into sheets 11 by 12 inches and fed into the rolling machine.

First the paper is run through a skiving machine that tapers the edges, so there is no ridge when it is rolled and glued. Then, the paper is cut into pieces 11 inches by 12 inches, rolled into an 11-inch tube and glued, and finally run through a sizing die to bring it to correct 12-gauge diameter. The tubes are placed in an oven to dry then run through a cutter that chops each tube into four, 2¾-inch hulls.

The next stage is the waxing room, a warm, rather mysterious chamber of odd smells dominated by two huge vats that were new about the time Colonel Whelen

The tubes are placed in an oven to dry, in preparation for sizing.

The rolling machine forms the sheets into tubes 11 inches long with walls 35/1000 inch thick.

was figuring out how to modify a Springfield. These vats are filled with hulls, then molten paraffin (common candle wax) is added, the lids are clamped down tightly – and heat and pressure do the rest.

It takes several hours for the hulls to absorb the paraffin. They are then decanted into large cardboard cartons, each one about four feet square, and moved into the curing room. This may be the most mysterious stage of all, since it involves a process that is completely foreign to modern manufacturing techniques. It is a process that cannot be hurried, no corners can be

The tubes are forced through a die that sizes them to the exact diameter necessary to become a 12-gauge shotshell.

cut, and any attempt to economize or make it more efficient results in disaster.

In the curing room, the hulls sit in about 100-degree heat, with humidity controlled, for nine days. Not eight days, and not ten – nine.

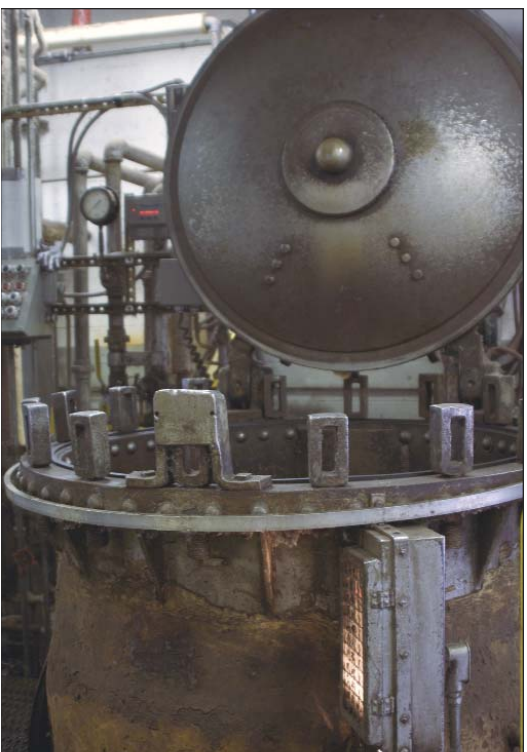
Paper hulls are made in a cluster of old buildings on the Federal grounds in Anoka.

Exactly. At the end of that time, the wax will be completely absorbed by the layers of paper in the rolled hulls, distributed evenly, and hardened.

The base wad of Federal Gold Medal Paper is also paper. It comes in brown rolls like masking tape and is then wound into a spool and inserted into the hull. With the base wad in place, the hull is headed up with a brass or steel head and finally primed.

It is one thing to sum up the process in a few paragraphs but quite another to make it actually happen. Tubes are produced on a collection of old machines that are operated, maintained and nursed

Dry hulls are put in a large steel waxing vat with molten paraffin. Heat and pressure do the rest.



The 11-inch tubes go into the cutting machine and emerge as 2¾-inch tubes.

by two mechanical adjusters, Jorge Vargas and Tim Ryman. Together, they operate all the machines and produce about 40,000 tubes a day. Keeping it all running requires a high degree of experience, skill and occasionally ingenuity.

At this stage, manufacture of paper shotshells becomes familiar to any handloader, with the insertion of powder, wad and shot cup. Unlike paper cartridges of old, Federal Paper is given a pie-crimp rather than a roll crimp with an over-shot wad. For handloaders who intend to reload the paper with black powder, this is actually a blessing because it leaves room for trimming ragged ends before applying a roll crimp.

Paper cartridges are loaded on one of three machines Federal still has in place for the purpose. According to Goodlin, as demand for paper shells waxes and wanes, they can bring the unused machinery back into production. They don't plan to get rid of it any time soon, which is reassuring.

The final stage of paper-shell production is carried out by Mona Goetze, a veteran of 38 years with Federal. As the finished cartridges roll down the line, each one is handled and inspected by Mona

The cut tubes are being inspected manually by Tim Ryman. Any with flaws are weeded out.

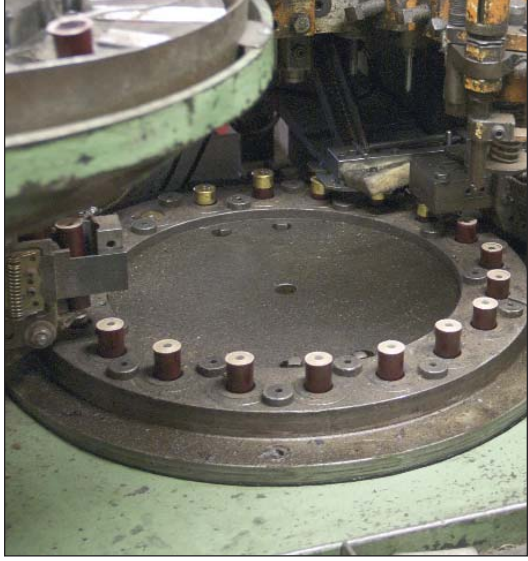
before being packed into their boxes.

The Federal line of paper shotshells is today limited to 12 gauge, since it is aimed primarily at trap-

Not Just on Paper

Mechanical adjuster Tim Ryman moves waxed tubes into the curing room.

The basic material for the traditional paper base wad comes in a large spool, like tape, and is tightly wound into a base wad.



Gold Medal Paper shotshells are headed with pure brass and primed.

shooters, but many of their loads can be used equally well for skeet, international trap and skeet and sporting clays.

It hasn't happened yet, but the time is coming when having the only remaining paper-hull capability in North America may prove to be a blessing for Federal. Not only do they have the physical capability but more importantly they have the expertise.

While plastic shotshells and wads are a blessing in many ways, they are an environmental disaster in some places, particularly wild areas in which a lot of shooting takes place. There are spots in the Okavango Delta in Botswana, along the sand grouse flight paths, where you feel ankle-deep in used wads.

On shooting estates in the United Kingdom, where shooters have stood and shot for more than a century, buildup of wads can become a real problem, and some estates now insist on the use of biodegradable wads – in effect, going back to the old fiber wads used when paper was the standard.

This may well become an issue on some shooting preserves in the United States. It's a lot easier to insist on the use of fiber in the first place than it is to spend hours picking up plastic wads. The wads are not just unsightly. In some areas, they are ingested by wildlife with the predictable result, and this could become an environmental and wildlife issue just as lead shot did 30 years ago.

In Britain, many estates contract with shotshell manufacturers to make special cartridges for them, using paper hulls, brass-washed steel heads and fiber wads – all biodegradable components – with the estate name printed on them.

Finished Gold Medal Paper shells are emerging from the loading machine.

They insist that all shooters use these shells exclusively.

Blixt & Co., which runs driven-pheasant shoots in Idaho, near the Tetons, insists that all shooters use paper-hulled, fiber-wadded H&H shotshells for this very reason. Other high-end shooting preserves, such as Highland Hills in Oregon or the Flying 'B' in Idaho, could consider doing the same thing, and if any wanted custom paper shotshells, where could they go but Federal?

The Federal line of paper shotshells is today limited to 12 gauge.

If this came to pass, it would also encourage Federal to expand production to include 20-gauge ammunition. Stranger things have happened, under the combined pressures of legislation and public demand.

Where lead is still legal, however, Federal Gold Medal Paper just as it sits is excellent ammunition for wingshooting. What could be better for bobwhites or ruffed grouse than an ounce of No. 8s in a light load or 1⅛ ounces of 7½s for pheasant? And, regardless of what any trapshooter says, there is nothing – *nothing* – like the scent of gunsmoke from a paper hull, wafted on the breeze on a crisp and sunny October day.

Mona Goetze, a Federal employee for 38 years, inspects and hand-packs the paper shells as they are loaded.

Cool Colt

John Haviland

Years ago I crawled to the crest of a prairie ridge in search of pronghorn antelope. After awhile I looked down to rest my eyes and spotted an eroded cartridge case sticking out of the dirt. The headstamp on the case read "44 W.C.F." The hunter who fired that .44 Winchester Center Fire cartridge may have crept up on that ridge 110 years before me. Most likely he was also hunting antelope, or sage hens, and his rifle was a Winchester lever action or perhaps a Colt Lightning pump. I put the .44 case in my pocket and kept it for years as a reminder of that pioneer.

Since then I have wanted a .44-40 rifle to complete the link to that hunter, and recently I got my hands on an original Colt Lightning in "44 caliber." It's been a fun, but laborious, journey bringing back the rifle to shooting condition, handloading and shooting it to develop accurate loads and finally carrying the aged rifle hunting in the spirit of the western homestead pioneer.

The Lightning was not in much better shape than the bones of that pioneer hunter. Its stock and exterior metal looked like it had bumped around in the box of a prairie schooner and then was left leaning against a cottonwood tree for a century. The rifle was considerably used because the checkering on the forearm was nearly worn smooth. Hoary rust sprouted from the recesses of the receiver.

Hours of scrubbing the metal with a toothbrush and sprays of Mirachem Gun Cleaner Degreaser (mirachem.com) removed the rust and gunk and left behind bare metal without a hint of bluing. An hour scrubbing the bore with a brush and solvent sent a river of rust

A resurrected Lightning goes hunting.

flowing out the muzzle. After soaking the bore with solvent for a few days, more and more rust poured out. Peering into the bore with a borescope showed the inside looked like a washboard red dirt road. There was a bit of encouragement when a lead slug pushed through the bore came out with fair marks from the lands and a diameter of .427 inch. Every time the bore is cleaned, though, I grimace when yet more rust comes out on the patches. Cleaning the stock and forearm with Murphy's Oil soap and a stiff brush turned the sink water black with dirt and rotten finish. Refinishing the wood is on the to-do list, because there is no concern about ruining the gun's collector value.

Left, the Colt Lightning .44 caliber is back out hunting after who knows how many decades of neglect. Top, 44 Cal *is the only marking on the Lightning that states it's chambered for the .44 WCF. Above, the Colt insignia appeared on the Lightning's receiver flat after hours of scrubbing away rust. Below right, the patent date is 1883.*

All that cleaning unveiled a medium-frame Lightning made in 1886, just three years after the .44 WCF cartridge was introduced. According to *Flayerderman's Guide to Antique American Firearms… and their values*, the medium-frame Lightning was manufactured between 1884 and 1902 with a production of 89,777 in .32 WCF, .38 WCF and .44 WCF. It was the first type of Lightning made by Colt. The small frame (1887 to 1904) followed in .22 short and long rimfire and the large frame (1887 to 1894) in cartridges from the .38-56 to .50-95 Express.

My Lightning is the standard first model with a 26-inch octagonal barrel, 15-round magazine and no sliding breech cover over the bolt. (However, my rifle holds only 14 rounds in its magazine.) On the top flat of the barrel is printed *Elliot's Patents May 29, 1883, Sept. 18, 1883*. Other models of the medium frame include a standard rifle with a breech cover; a military rifle or carbine with sling swivels, bayonet lugs and a shortened magazine tube; a carbine with a 20-inch barrel and a 12-round magazine; a baby carbine that weighed 5¼ pounds; and 400 carbines in .44-40

Cool Colt

The .44 Winchester Center Fire cartridge has been loaded by nearly every ammunition company during its lifespan and has gone by several names. The original name was the .44 WCF; today it is called the .44-40.

for the San Francisco Police Department.

My Lightning was built to withstand pressures from black powder. The circular locking brace in its action cams the bolt securely shut at that low pressure. However, rearward force resulting from firing a cartridge that develops higher pressure might well push the bolt back right over the top of the brace. That's probably happened more than once to unsuspecting shooters who blindly shot factory-loaded, high-velocity cartridges or blindly followed recipes from some handloading manuals.

I have a handful of old, standard-velocity cartridges with headstamps that read *W.R.A. Co 44 W.C.F.* that are loaded with 200-grain cupro-nickel jacketed bullets .428 inch in diameter over 16.0 grains of some sort of smokeless powder. The powder is bulky enough that it's compressed when the bullet is seated. These loads averaged 1,046 fps from the Lightning. The headstamp is *44-40* on some old W.C. Co. cartridges with copper jacket bullets that measure .426 inch in diameter. The smokeless powder in these cartridges, circle-shaped kernels with a hole in the middle, also weighed 16.0 grains. However, the powder charge only filled the cases to below the base of a seated bullet. I wasn't able to record the velocity of these bullets because every cartridge was a dud.

Winchester introduced a high-velocity .44 WCF load in 1903 with a 200-grain jacketed bullet bumped up from the original 1,300 to 1,500 fps and a few years later upped the speed again to 1,570 fps. These loads were intended for rifles with stronger actions, like the Winchester Model 1892. A warning was included not to fire the cartridges in a Winchester Model 1873 or revolver, but surely many of the cartridges were.

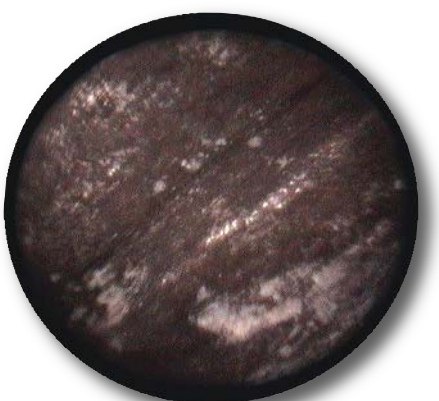
Reloading manuals from 50 years ago and more also contained some rather hot loads. For instance, the *Lyman Reloading Handbook 43rd Edition*, 1964, lists .44-40 rifle loads with a 200-grain jacketed bullet at 2,100 fps with 27.5 grains of 2400 powder and 1,990 fps with 29.0 grains of IMR-4227. These are rather stiff .44 magnum loads. A Winchester Model 92 might withstand shooting a few of those loads, but they would tear my Colt Lightning apart at the seams.

The 2002 *Lyman Reloading Handbook 48th Edition* throttled back those loads considerably. It lists maximum loads for a 200-grain jacketed bullet at 1,638 fps with 20.0 grains of 2400 and 20.5 grains of IMR-4227 for 1,455 fps.

After soaking the bore with solvent for a few days, more and more rust poured out.

Lyman states those loads have a maximum pressure of 22,000 CUP and are suitable for rifles with relatively strong actions like the Winchester Model 92 and Marlin Model 1894. The newer Lyman book also lists lighter loads with a maximum pressure of 13,700 CUP for rifles with weaker actions like the Colt Lightning and Winchester Model 1873. The *Speer Bullets Reloading Manual #14* also lists .44-40 loads for 200-grain cast bullets with pressure limits of 13,000 CUP. I stayed with these lighter loads for my old Colt.

Groove diameter measured a somewhat standard .427 inch in the Colt. The rust-cankered bore, though, had very shallow lands, and cast lead alloy bullets fired at over 1,000 fps must have lost their grip on the lands, because accuracy sailed out the window at that and higher velocities. In fact, accuracy was so poor the bullets



The bore of the Colt Lightning was terribly rusted. If velocities were kept at 1,000 fps and slower, the rifle shot acceptably well.

A soft lead slug pushed through the bore of the Lightning came out measuring .427 inch.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Cool Colt

These bullets were shot in the Colt Lightning. From the left: Lyman 42798, RCBS 44-200-FN, Laser-Cast 200 RN FP BB .427 inch, CMC 200 RNFP .429 inch and Hornady 200-grain XTP.

These are some of the powders that worked well with 200-grain bullets in the .44-40. Two that stand out are SR-4756 and IMR-4227.

might have had a difficult time making it through a window. Some of them hit the target sideways, but mostly they did not hit the paper at 25 yards.

To treat the rifle's bore kindly, I cast bullets from Lyman and RCBS moulds of 1-to-20 (tin/lead) alloys from Bill "Antimony Man" Ferguson. I was hoping this relatively soft alloy with a Brinell hardness number (BHN) of around 10 would allow the bullets to expand on firing and seal the bore to grab what rifling was there. The Lyman bullet dropped from the mould with a diameter of .428 inch and from the RCBS design at .429 inch. I ran the bullets through an RCBS .428-inch sizing die to pretty much only add lubricant.

The RCBS 44-200-FN cast bullet got the short end of the stick of this higher velocity. The bullets failed to hit four sheets of paper when fired with 27.0 grains of Pyrodex RS at 1,263 fps. That amount of Pyrodex was compressed by the bullet, and the velocity spread was only 15 fps. That was about a 10th of the spread of most of the other powders. The Pyrodex's cloud of smoke wafting toward the heavens was sort of pleasant though. Accuracy was also dismal with Unique and Accurate 5744. To give the RCBS bullet a fair

Colt Lightning .44-40 Loads

bullet (*grains*)	powder	charge (*grains*)	velocity (*fps*)	25-yard group (*inches*)
200 Hornady XTP	IMR-4227	18.0	931	1.38
	Unique	8.0	675	1.55
Lyman 42798	Bullseye	6.0	970	1.15
	Clays	5.0	808	1.51
	IMR-4227	17.0	950	.71
	SR-4756	7.5	779	1.80
RCBS 44-200-FN	AA-5744	16.5	1,045	4.00
	Clays	5.0	789	3.35
	IMR-4227	17.0	965	1.05
	Pyrodex RS	27.0	1,263	–
	Unique	8.5	1,105	–
	Universal	6.5	628	2.70
200 Laser-Cast RN FP BB .427	Red Dot	6.0	917	4.50
	American Select	6.0	901	4.25
	Trail Boss	6.4	903	3.60
	SR-4756	8.0	718	1.46
200 CMC Shooting Supplies, moly-coated RNFP .429	Titegroup	6.0	1,012	–
	Bullseye	6.0	1,000	5.0+
	Red Dot	5.9	984	4.50
	Trail Boss	6.0	941	.68
200 WRA Co. cupro-nickel jacket			1,046	1.94

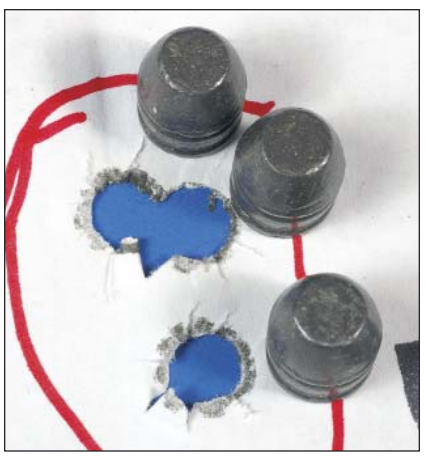
Be Alert – Publisher cannot accept responsibility for errors in published load data.

RCBS Cowboy three-piece dies were used to load .44 WCF cartridges for the Colt pump action.

shake, I loaded it with 17.0 grains of IMR-4227 and returned to the range. Its average speed was 965 fps, and three of the bullets landed in 1.05 inches at 25 yards.

The Laser-Cast bullet has a BHN of 24, and it failed to shoot well with three powders that pushed the bullet about 900 fps. Perhaps the hard bullets failed to obturate in the bore. But then what's the explanation for the 1.46-inch group at an even slower 718 fps with 8.0 grains of SR-4756? Perhaps nothing can be explained with such an eroded bore.

Perhaps a bit larger diameter bullet might shoot better. However, a .429-inch bullet supposedly will not fit in a properly dimensioned .44-40 chamber, but the CMC Shooting Supplies .429-inch, 200-grain bullet fit in Starline .44-40 cases without swelling the necks, and the cartridges fit in the chamber. Once again, accuracy suffered when velocities exceeded 1,000 fps. I stepped up a bit more in bullet diameter with .430-inch Hornady 200-grain XTP bullets. The Hornady bullet required a bit more force to seat in a case, and the first bullet I seated slightly bulged the case at the junction of shoulder and body. An ever so slight amount of case sizing lubricant on the circumference of the bullets reduced the force to seat them and no hump appeared on the cases. The Hornady bullets shot pretty well, but then again their speed was kept below 1,000 fps.



Above, this group was fired with CMC Shooting Supplies 200-grain RNFP bullets and 6.0 grains of Trail Boss. Right, accuracy suffered when velocities passed 1,000 fps. One RCBS 44-200-FN bullet hit the target sideways when the bullet was fired with 8.5 grains of Unique.

Cool Colt

I was given all sorts of warnings about the pitfalls of reloading .44-40 cases, even by folks who have never loaded the cartridge. Evidently they read about crumpled case mouths, collapsed shoulders, misaligned bullets and such on the Internet and consider it gospel.

After decades of neglect, the Colt .44 was back hunting. These Franklin's grouse were plinked out of a tree with the Colt.

I never had any problems. I made sure the bullets were fairly straight in the cases before seating them and raised the press ram slowly to make sure the cases were straight when they entered the seating die. The interior of the seating die of the RCBS Cowboy dies meshed closely with the case diameter, because when I removed a case with a partially seated bullet, the bullet was completely straight with the case mouth. The seating stem was also aligned tightly with the wall of the seating die, since not one bullet of the proper diameter bulged the thin necks of the .44-40 cases. To ensure the thin necks and case mouths did not buckle, I intended to seat and crimp bullets in separate steps, but there was no need. Of the 100 Starline cases I started with, I have lost only one. That case was lost when I took the Lightning hunting.

A homesteader living in a sod hut on the prairie or a log cabin in the mountain foothills was flush and lucky if he owned one firearm, and he used that gun for all his hunting. In that vein I set out on a mountain trail on a blue-sky September morning, balancing the Lightning with the forearm in the palm of my hand. The rifle was loaded with four .44-40 cartridges made up with Laser-Cast 200-grain bullets and 8.0 grains of SR-4756.

Groove diameter measured a somewhat standard .427 inch.

The trail led past Fool Hen Springs. At the upper end of the springs sat three Franklin's grouse. The grouse perked up their heads at the slick of me pumping the forearm's short cycle to chamber a cartridge. I shot all three of the grouse within a few seconds. The following night at home we ate them with applesauce made of apples from our tree out back.

The Colt ejected the spent cases over my shoulder, and I could not find where one landed in the clumps of beargrass. Perhaps someone will find that case 100 years from now and wonder what game some hunter had been seeking with such an old-time cartridge. ●

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.303 Brit

John Barsness

The .303 British was introduced late in 1888, along with the bolt-action Lee-Metford rifle, and was originally loaded with compressed black powder and a 215-grain cupronickel jacketed bullet at 1,850 fps. This was two years *after* the French military had introduced the 8mm Lebel, the first mass-produced cartridge loaded with smokeless powder, and the same year Germany adopted the Model 1888 Mauser and the smokeless 8x57J cartridge.

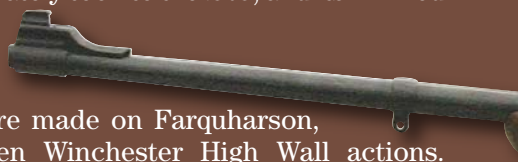
The British could see the smokeless future, partly because their own smokeless propellant (it could hardly be called a "powder"), cordite, was in the works. So they produced a cartridge and rifle that could easily be converted to smokeless powder, and in 1891 cordite upped the velocity of the 215-grain .303 load to 2,050 fps.

Cordite was partly developed to get around French and Swedish patents on smokeless powder, so Britain wouldn't be dependent on foreign sources for military powder, but was a far-from-ideal solution. Aside from the hassle of stuffing its spaghetti-like strands inside cartridges, cordite was highly erosive.

The Lee-Metford rifle combined a bolt action designed by American James Paris Lee and a barrel with polygonal rifling developed by British engineer William Ellis Metford. The shallow Metford rifling worked well with black powder but eroded quickly when subjected to cordite. The Royal Small Arms factory at Enfield solved the problem by developing a rifling pattern with sharper, deeper grooves, and the "new" rifle became known as the Lee-Enfield.

One source estimates that around 17 million Lee-Enfield .303s have been built by factories in Britain, the U.S.A., Canada, Australia and even Pakistan, which purchased the machinery from English factories when the Lee-Enfield was phased out by England. The .303 British survived longer as a military cartridge than any of its nineteenth-century contemporaries, serving Great Britain until 1957, when it was replaced by the 7.62x51 NATO. Even then the .303 served in some former British colonies until the 1970s.

Hunters immediately took to the .303, and its rimmed case was perfectly suited to single shots. Quite a few were made on Farquharson, Martini and even Winchester High Wall actions. Though most hunters automatically connect W.D.M. Bell with bolt actions and the 7x57 Mauser, Bell's first African hunting rifle was a single-shot .303, purchased second-hand in Scotland in 1897 when he was 17, prior to leaving for Kenya.



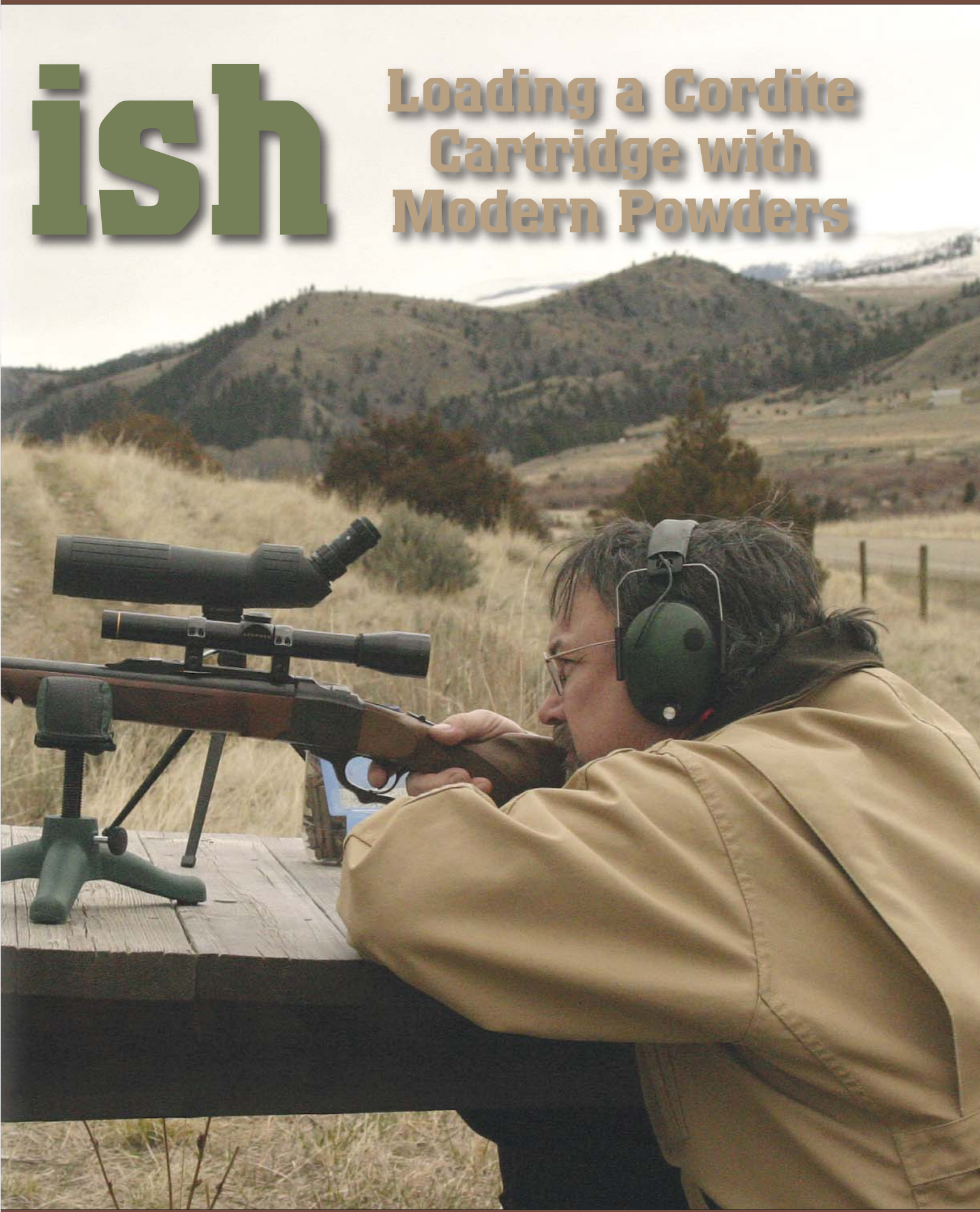
Once in Africa Bell discovered that his fine rifle had its faults. "Under temporate [*sic*] climes it had presented no difficulties, but now under African suns the fired cartridge cases almost refused to leave the chamber. . . . I would have to shoot mighty close and carefully as I could not count on a second shot in a hurry. To this early training much of my later success was probably due."

In reality the problem lay not so much with the rifle but cordite, since among its other charming characteristics, cordite was also extremely heat-sensitive. Many early British smokeless rounds had two factory loadings, one for cool weather, such as when stalking red deer in Scotland, and a "tropical" loading with a reduced charge of cordite for use in the hotter regions of Africa and India.

The No. 1A is a relatively light rifle, but recoil was still mild, even off the bench.

ish

Loading a Cordite Cartridge with Modern Powders



The .303 (left) is very similar to the .30-40 Krag (center); they even use the same shellholder. Case capacities are slightly less than the .308 Winchester (right).

In recent years Ruger has been chambering its No. 1 rifle, a modern semi-copy of the Farquharson, for a variety of retro-rounds. This is easy to do with single-shot rifles, since there aren't any potential feeding problems, except the physical coordination of the shooter. In 2010 Ruger announced it would soon be making some No. 1s in .303.

I happened into Capital Sports & Western Wear in Helena, Montana, one day late that summer. My friend Tom Brownlee was working the gun counter, and he silently grabbed a No. 1A off the rack and handed it to me. Of course, the barrel was inscribed ".303 British." I really didn't need another rifle at the moment – but as we all know, need has nothing to do with it.

Plus, my loading room already held everything required to shoot a .303, including RCBS dies, some 20-year-old Federal factory loads and a couple of boxes of .311-inch bullets. This was because I already owned a Mark 4 No. 1 Lee-Enfield, one among bazillions of "sporterized" military rifles that appeared in the U.S. in the decades after World War II.

My .303 had been the big game rifle of my uncle Larry, my father Jack's only sibling, who essentially replaced his brother in my life after my father died when I was 16. Larry picked his rifle out of a barrel full of $15 Lee-Enfields at a store in Missoula, where he taught at the University of Montana. (This was a common way of "marketing" mil-surp rifles back then; I can remember a barrel full of Lee-Enfields in Bozeman's Coast to Coast store as late as 1966.) Larry's rifle had been "sporterized" by cutting down the military stock, but aside from that it was as-issued. Among the animals he took with it was a big mule deer weighing almost 200 pounds field-dressed, back in the day when most Montana deer were "scored" by body size and not inches of antler.

Larry gave me the .303 in the late 1980s, when he quit hunting at age 70. I did a little fiddling with it back then but didn't fire it again until the Ruger came home. Owning a pair of .303s seemed like a grand opportunity for experimentation.

The first step was to scope the No. 1A. A prototype of the new 3x from Leupold's custom shop was lying around loose and seemed like a perfect match. Unlike the old 3x, the new model has multicoated lenses and click adjustments.

Some time was also devoted to comparing Ruger's .303 to Great Britain's. Larry's rifle is a typical World War II hurry-up job with a two-groove barrel. (Mark 4 No. 1s were fitted with barrels with three kinds of rifling: left-hand two and five groove and right-hand six groove, all with a twist of one turn in 10 inches.) It has two different serial numbers, indicating it was cobbled together from parts produced by separate British factories: Fazakerley, a suburb of Liverpool, and Shirley in Warwickshire. The marks also include a faint "broad arrow," denoting ownership by the British government.

One source estimates that around 17 million Lee-Enfield .303s have been built.

Slugging the barrel came up with a bore diameter of .301 inch and a groove diameter of .312. The bar-

A wide variety of .303 bullets are made, and even some .30-caliber bullets will work in some rifles. From left: Sierra 125-grain ProHunter, Barnes 150-grain Triple-Shock, Sierra 174-grain MatchKing, Sierra 180-grain ProHunter and Nosler 220-grain Partition.

.303 British

RCBS includes the .303 British in its standard reloading dies.

rel is a little shorter than the nominal 25¼ inches standard in Mark 4 rifles, because I discovered that a short section of the bore just inside the muzzle was deeply pitted. I hacksawed that section off, then recrowned the muzzle using a Brownells hand tool, whereupon accuracy improved considerably.

The Ruger barrel is six groove with the standard American right-hand twist, the bore slugging .302 inch and the grooves .313. Like other recent Ruger bores, it appears to be lapped, though this particular barrel is even smoother than most. In fact, through a Hawkeye borescope, it looks almost as good as many custom barrels, with only the faintest hint of reamer marks visible. The chamber throat is about half the length of the Lee-Enfield's.

Ruger factory triggers have also improved considerably in recent years, and on my Timney trigger scale, the No. 1A's averaged just less than 3 pounds. The long, two-stage trigger of the Lee-Enfield averaged 4 pounds, 4 ounces, varying about half a pound. Both rifles are pretty light, the Ruger weighing 7¾ pounds with the 3x scope; the Lee-Enfield, 8 pounds.

Along with handloads in new Winchester brass and the Federal 180-grain factory loads, I also had 60-some rounds of fairly old but well-preserved British Mark VII ammunition, the standard military load from 1910 onward, with a 174-grain, full-metal-jacket spitzer at a nominal 2,440 fps. These came from my friend Bob Jeffreys in a trade, after he acquired the ammunition in another trade for "a bunch of rifle stuff." I thought it would be interesting to see where it shot with the Lee-Enfield's military sights.

Another experiment involved shooting .308-inch bullets in both rifles. When my wife, Eileen, and I went to Namibia with Tom Brownlee in 1999, he brought a Lee-En-

field sporter he'd restocked himself. His rifle shot Nosler 180-grain Partitions into about an inch, using IMR-4895 powder, though that was the only .308-inch diameter bullet that shot well in his rifle.

Bell's first African hunting rifle was a single-shot .303.

The accuracy of the Partitions isn't totally surprising. Many years ago I was on a prairie dog shoot with some of the Nosler boys, and one evening several of us sat around talking rifles (surprise!). Then head-ballistician Gail Root suggested that if Partitions didn't shoot all that well with a particular powder, switching to a faster powder often helped, "bumping up" the rear cores so the bullets fit the bore tighter.

The test rifles were a Ruger No. 1A and a Lee-Enfield Mark 4 No. 1 made during World War II.

There's no current American .303 data for bullets heavier than 180 grains, because no American company makes them anymore. Woodleigh makes a Weldcore 215-grain bullet, but I couldn't find any so decided to try Nosler 220-grain Partitions instead.

Some of the best current data for 215s is from Australian Defense Industries (www.adi-powders.com), the company that makes Hodgdon's Extreme powders. Australian handloaders used these for years before the Extreme line appeared in America, and since the Aussies load the .303 a lot, I decided it would be worthwhile to try some of their loads for AR2208 (Varget) and AR2209 (H-4350). Another source is Canadian Steve Redgwell's book *Shooting & Reloading the 303 British and the 303 Epps* (www.303british.com), which can be downloaded off the Internet for only $9.99. The .303 Epps is an "improved" .303 British, developed by the late Ontario gunsmith Elwood Epps, upping the ballistics of the standard .303 to .30-06 levels. Along with loading data, Redgwell's book also contains some practical information about shooting Lee-Enfields.

Both rifles proved to be very accurate, and it was even relatively easy to sight in the Lee-Enfield. While some Mark 4 No. 1s came with micrometer-adjustable aperture sights, Larry's rifle has a "fixed" two-aperture sight that can be flipped back and forth between 300 and 600 yards. Using the 300-yard aperture, the Federal 180-grain factory and the Mark VII military ammunition were dead-on for elevation at 100 yards – though the Mark VII rounds proved to be somewhat unreliable.

On the first shot, the rifle didn't go *bang* exactly when expected. I blamed this on the operator not having pulled a two-stage trigger for awhile, but then the second round didn't go off at all. Fortunately, the Lee-Enfield can be recocked manually, like the 1903 Springfield. On the second try, the round went *bang*, though it was a definite hangfire. The third round (the last shot) was also a hangfire, but all three formed a decent group and averaged pretty close to the specified 2,440 fps.

The front sight had to be drifted slightly in its dovetail to center the

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.303 British

The Lee-Enfield shot very well with several loads, despite the two-groove barrel.

The Ruger No. 1A shot under an inch with several loads. (The lone shot on right is a sighter.)

groups at 100 yards, but that was easily done. Essentially, the old rifle shoots to the sights with any ammunition approximating the Mark VII ballistics.

One of the shooting sessions took place at my friend Jay Rightnour's private range, and he was there to spot my targets. Jay's a very fine shot (He competes in black-powder silhouette.) and was astonished at how well the No. 1A grouped with its best loads. The holes from the first three 180-grain Sierra Pro-Hunters were all touching! That .31-inch group, of course, was a fluke, since a 3x scope can only resolve about ⅓ inch at 100 yards, but the load did average under an inch. The same 180-grain load (48.0 grains of H-4350) has also shot well in the four .30-40 Krags I've owned, no doubt because the Krag case is almost identical to the .303.

The .303 and .30-40 have slightly more powder capacity than the .308 Winchester. A few of the loads were increased enough to approximate .308 factory ballistics of 2,820 fps with 150-grain bullets and 2,620 fps with 180s; all shot well. Still, the standard .303 ballistics of 2,700 fps with 150s and 2,440 fps with 180s has been killing big game neatly for more than a century now, and the extra zip only gains another 50 yards of "terminal ballistics."

.303 British Loads

bullet (*grains*)	powder	charge (*grains*)	velocity (*fps*)	group (*inches*)
Lee-Enfield Mark 4, No. 1 (24.75-inch barrel):				
174 Sierra MatchKing	Varget	42.0	2,495	1.72
180 Sierra ProHunter (.308)	H-4350	48.0	2,489	4.44
180 Sierra ProHunter	VV-N540	44.0	2,604	1.62
180 Nosler Partition (.308)	Varget	41.0	2,456	2.51
174 FMJ Mark VII military load			2,438	2.63
180 Federal factory load			2,433	1.62
Ruger No. 1A (22-inch barrel):				
125 Sierra ProHunter	AA-2015	41.5	2,692	1.37
|	|	44.0	2,899	1.51
150 Sierra ProHunter	Varget	43.0	2,516	1.08*
|	|	46.0	2,702	.97
|	RL-15	44.0	2,687	1.55
|	Big Game	50.0	2,804	1.24
150 Barnes TSX	Big Game	50.0	2,693	.94
180 Nosler Partition (.308)	H-4350	48.0	2,500	1.90
|	|	50.0	2,604	1.28
|	IMR-4895	43.0	2,538	1.87
180 Speer DeepCurl (.308)	H-4350	48.0	2,487	1.97
180 Sierra ProHunter	H-4350	48.0	2,449	.79
220 Nosler Partition	Varget	40.0	2,170	1.97
180 Federal factory load			2,407	1.26

* Same point of impact as 180 Sierra/48.0/H-4350 load.

Be Alert – Publisher cannot accept responsibility for errors in published load data.

Tom Brownlee took a Mark 4 No. 1 Lee-Enfield to Namibia in 1999, loading it with .30-caliber, Nosler 180-grain Partitions. Many .303s will shoot Partitions pretty well, evidently because the rear core "bumps up" to fill the rifling. Tom restocked the rifle himself.

The Lee-Enfield has a generous chamber, typical of rifles built during World War II, and some cases showed considerable stretching near the head after firing. One of the virtues of the Lee-Enfield is an interchangeable bolt head, to compensate for wear. This rifle has the number 0 bolt head, so headspace could be shortened by replacing it with a number 1, 2 or 3 bolt head.

Some measurement of cases fired in both rifles, however, indicated that the problem wasn't so much excessive headspace as a wide chamber. Cases fired in the Ruger expanded .413 to .419 inch at the pressure ring, while those fired in the Lee-Enfield measured .423 to .430 inch, with a noticeable bulge. Instead of finding another bolt head, the case-stretching prob- lem was fixed by loading the rounds for the SMLE slightly on the mild side, then partially sizing the cases thereafter.

The cases loaded with .308-inch bullets were simply run into the RCBS full-length die with the expander/decapper assembly removed. This resulted in necks with an inside diameter of .307 inch, which held bullets perfectly. At around 2,200 fps, the Nosler 220-grain Partition will do nicely for Alaskan moose or African eland at moderate ranges, and the other loads will do for any smaller big game, just as they have for over a century. ●

Cartridge Board

(Continued from page 35)

chambers. European collectors say there are others. Good heavens!

Perhaps, however, this was all intentional. The average hunter was confused, so he simply went back to where he bought his rifle to get ammunition. There he would (hopefully) get the right thing. The British gun trade engaged in this to some extent as well. It was a good way to guarantee ammunition sales, I guess.

There is also no agreed upon date of introduction for the 9.3x57mm. Again, this points to a wildcat that Mauser offered because hunters asked for it. German catalogs that carried the round in the 1930s list a 286-grain softpoint at the equivalent of 2,000 to 2,050 fps. A rather low breech pressure is shown that has to be in deference to rifles built on actions other than the Model 98.

At any rate, the cartridge somehow traveled to Sweden where moose hunters adopted it. Records show Husqvarna produced its first centerfire repeating sporting rifle, the Model 46 (on the military Model 94 carbine action) in 1927. Chamberings were 6.5x55, 9.3x57 and 9.3x62. Later the rifle was also built on Model 98 actions that came from military rifles.

References insist DWM and RWS loaded the 9.3x57mm up to World War II, but my few catalogs don't show it. They do show the 9.5x57 Mannlicher.

All this makes no difference today, because Norma has offered 9.3x57mm ammunition for many years. In 1958 a 232-grain hollowpoint was loaded to 2,330 fps and a 286-grain softpoint achieved 2,070 fps muzzle velocity. Both loads produce over 2,700 foot-pounds (ft-lbs) of muzzle energy. Pressure was held to 34,000 CUP. In comparison, the 9.3x62 records 2,630 fps and 2,360 fps with the same two bullets, but pressure is 44,000 to 47,000 CUP. The 9.3x57 disappeared from Norma lists in the 1970s, coming back in only the 286-grain softpoint form in the 1980s.

Today empty cases, bullets and loaded ammunition are cataloged by Norma. A 232-grain slug called Oryx is loaded to 2,362 fps. A modern, bonded-core bullet, its 2,875 ft-lbs of muzzle energy exceeds the .358 Winchester and comes close to the .35 Whelen while operating at a much lower pressure. Norma also offers a classic 285-grain bullet, the Alaskan, loaded to 2,067 fps. This is a very blunt roundnose featuring a heavy jacket. Anything shot with this number at close quarters would definitely stay shot!

Finally, there is the 232-grain full metal jacket (FMJ) load called Jaktmatch. The catalog states . . . "for training and competition, plus excellent bird and small game ammunition." Muzzle speed is shown to be 2,215 fps. Given that the .338 Winchester Magnum and 9.3x62mm also have such loadings available, there must be some form of commercial hunting application.

Even though the 9.3x57mm Mauser is not a common round, those lucky enough to have an original Mauser sporter or other European gun need not hide it in the gun cabinet. A box of Norma ammunition, some snow on the ground and it's time to go hunting! Even though we don't know for sure who is responsible for the round or exactly when, we do know the woods, and Mauser rifles are its home.

CAST BULLET DESIGNS

(Continued from page 49)

carrying it have glided smoothly through every .44 Special/.44 Magnum lever action I've sampled.

Let's step up to big bores. After the Marlin Model 1881 suffered those magazine tube explosions in government testing, the Ideal Reloading Tool Company (bought by Lyman, circa 1926) developed a .45-caliber, 405-grain RN/FP cast bullet design. It was labeled specifically for Marlins and was numbered 457193. It remains in Lyman's catalogs to this day. It's still plain base, still rated at 405 grains and still has four grease grooves. That 405-grain weight is nominal of Lyman No. 2 alloy. Cast of 1-20 alloy, mine weigh 420 grains. I've fired thousands of 457193s through single shots and leverguns. It is never a poor .45-70 bullet choice for hunting big game and does fine for target work out to 300 yards or so. I've had no problem getting 2 minute-of-angle (MOA) groups from BPCR target rifles out to that distance.

This may be considered a corollary to Lyman's 457193. RCBS offers a very similarly shaped .45-caliber bullet design, except it wears a gas check – 45-405-FN. Mine weigh 410 grains of 1-20 with gas check attached. Over the years my method of loading Lyman 457193 and RCBS 45-405-FN have evolved thusly. If black powder will be the propellant in any style of .45-70 rifle, then Lyman's plain-base version is used. For smokeless powder loads, the RCBS gas-check style is preferred.

There are vast numbers of other fine RN/FP bullets about. When not casting my own for .38 WCF/.40 S&W, the ones from Magma Engineering's mould and offered by numerous custom casters work perfectly. Lyman's 311041 (formally 31141) was developed for .30-30 leverguns. It's a 170-grain gas check. I've used it in .30 calibers up to .300 Weatherby Magnum with good results. Hornady is even making swaged lead RN/FPs in .38, .44 and .45 sizes. My only handloading experiences with them have been with the 205, .427-inch version in .44 WCF, and the results were good.

Quite often people ask me for my recommendations on cast bullet designs. When the task isn't specialized, the RN/FP is my primary "go to" choice. •

Real Avid Gun Boss Pro Cleaning Kit

INSIDE PRODUCT NEWS by Clair Rees

When it's time to clean one of my handguns, I typically have to hunt down a cleaning kit designed to fit the gun's bore size. Most of my cleaning kits are packaged in elongated boxes that take up room on the shelf and are a bother to carry afield.

Real Avid now offers a compact pistol cleaning kit that fits everything from .22- through .45-caliber handguns. The Gun Boss Pro kit contains two woven-steel, brass-tipped flex rods with a T-shaped handle. The flexible rods are covered with a durable, non-marring material to prevent damage to the rifling. Three machined brass brushes and two brass tips slotted to hold cleaning patches are included, along with a package of 30 thick cotton patches and a screw-top plastic bottle to hold five ounces of your favorite solvent or gun oil (not supplied). Also included is a compact bore light with a 5-inch flexible neck. A magnet on the base can be attached to the handgun, allowing hands-free inspection of the bore, magazine, interior of the slide or other parts.

This well thought out kit simplifies gun-cleaning chores. It comes packed in a triangular 6x6½-inch, zippered, polyurethane-armored clamshell case. All components

are neatly organized by an internal tray that keeps brushes and cleaning tips separate from the other gear, which fit neatly into mesh-covered compartments on either side of the clamshell. This is one of the neatest, no-nonsense cleaning kits I've seen.

Similar Gun Boss Pro kits are offered for rifles and shotguns. MSRP: $34.99. For more information, contact: Real Avid, 1-800-286-0567, or visit www.realavid.com online.

MTM Tactical Range Box

I have a few friends who are seriously into AR-style rifles. By "seriously," I mean they own several of these rifles and shoot them every chance they get. If they're not practicing at the range, they're participating in various matches; and wherever they go, they carry all kinds of accessories and lots of ammunition.

Recognizing a growing need, MTM Case-Gard has recently introduced a new Tactical Range Box specifically for tactical firearm enthusiasts. The durable, polymer box is designed to serve both bolt-action and autoloading AR-type rifles.

Two adjustable gun forks firmly hold rifles and shotguns in place,

and an all-new action block insert arm fits the magazine well of AR-15/M16 rifles. The result is excellent support for cleaning these rifles or mounting sights, high-intensity lights or other accessories.

The Tactical Range Box features a two-piece design. The removable top can be used to store gun oil, solvents, brushes, patches, screwdrivers and other cleaning or maintenance accessories. Opening the top gives you access to a deep-storage area that can store ammunition, powder and other larger items.

Made here in the U.S.A, MTM's Case-Gard Tactical Range Box is offered in black only. MSRP is $54.95. For more information, check with your local sporting goods store. You can also contact MTM Molded Products online at: www.mtmcase-gard.com.

Hornady Lock-N-Load Power Case Prep Assistant

Hornady's new Lock-N-Load Power Case Prep Assistant makes important case preparation chores fast and easy. It features a high-torque, low-speed motor that powers chamfering and deburring tools.

Primer pocket cleaners, case neck brushes and other 8-32 threaded tools are optional accessories that make the Power Case Prep Assistant even more versatile. These useful tools can be organized and kept close at hand in the unit's onboard storage compartments. The motor is covered by a durable, brushed aluminum housing.

The Lock-N-Load Power Case Prep Assistant is compatible with 110- or 220-volt power. MSRP: $120.88. For more information, visit the company's website online at: www.hornady.com.

At the BPCR Silhouette events Mike attends, most competitors leave their gear, sans rifles, set up under the range covers. He has never heard of a single item being missed.

Mike's Shootin' Shack

(Continued from page 33)

with some sort of benefit. Being an avid hunter herself, and living in an area where firearms and hunting are a way of life, she felt that a turkey shoot might be a viable idea.

To that end she got permission to hold it on a rancher's property. Then she organized rifle, handgun and shotgun events. She also put out word that there would be an auction of donated items. Locals donated things from horse tack to guided fishing and hunting trips. There was even a pair of mules on the block.

Being a long-time family friend of the Wineses, I volunteered to bring my World War II submachine guns, knowing that most residents of this area had never even seen such firearms let alone fired them. People could buy tickets for an amount of ammunition to fire from one or another of the four I brought. The price wasn't cheap, so I wondered if I'd be very busy that day. Year-round locals here aren't all that wealthy, and as said, the economy isn't all that great either.

I needn't have worried, for gun folks are nothing if not generous.

At 10 A.M. that day, I stood up to let my first "customer" fire a genuine "Tommy-gun." I didn't get to sit down again until 3:00 that afternoon when the auctions started and shooting ended. During that entire time, three people were behind me loading magazines, and Yvonne was with me helping make sure that all shooting went safely.

Furthermore, the sound of gunfire at the rifle, handgun and shotgun ranges was continuous during that time. Every auction item sold well too. I won't tell how much money was raised on that single day but will stress that every penny that came in the gate went to the cancer patients. Everyone involved was both amazed and ecstatic with the bottom line.

True gun folk make me proud. •

(Continued from page 90)

man who adopted the *nom de plume* "20-Bore." The full title was *Practical Hints on Shooting, being a treatise on the shotgun and its management; game, wildfowl, and trap shooting; together with notes on sporting dogs and ferrets, and other useful information relative to shooting*. As the title suggests, "20-Bore" set out to be comprehensive, and he had the knowledge to do it.

In Chapter V, "Powder, Shot and Cartridges," Tozer goes into considerable detail about black-powder loads as well as the early nitro (smokeless) compounds and the combinations used in different gauges for different purposes. In the course of this outline of handloading, he describes the various methods amateur shooters were then using to test loads they put together themselves. Chronographs were generally unavailable, since that technology was in its infancy, so they resorted to other methods of testing shot charges. Since they could not test for actual velocity, they used the term "power" instead.

One method of comparing the power of one load to another was to place one's self in the middle of a pond, shoot the gun straight up into the air and measure the time it took for the shot to reach its maximum height and return to earth, landing in the pond around the shooter. Another method, which was really "power cum penetration," employed multiple sheets of cardboard or copper and counting the number of sheets that were penetrated. A variation on this used single sheets of different thickness.

In the 1880s, choke in barrels was not yet common, and shooters tried different approaches to keep the shot together and lengthen range from cylinder barrels. The usual approach was some kind of "concentrator" that would hold the shot charge together after it left the barrel then release it to

spread downrange. One such used a fine wire basket – in effect, employing artillery grapeshot for a sporting purpose.

There's a funny story connected with these things. After the introduction of choke in 1866, there ensued a great controversy over whether choke barrels were superior to cylinder, or vice versa. The editor of *The Field*, J.H. Walsh, let the pandemonium build up then, in 1876, sponsored one of his *Field*-tests, pitting choked barrels against cylinder to decide the question.

The cylinder barrels won, but it turned out they'd been using concentrators. In a rematch of choke versus pure cylinder barrels, choke won at the longer distances. The choke they were using was full, by our standards, and they later discovered the best combinations are somewhere between cylinder and full, but many old guns from that era have exactly that – cylinder and full – as their constrictions on right and left barrel. By the way, Lord Walsingham was a great proponent of cylinder bores for game shooting, and I for one am not about to argue with him.

Another type of concentrator, developed by Charles Lancaster, was a fiber cup, much like a modern shot cup but which was placed upside down over the shot charge, pressed down around it and crimped in place. It resembled a Foster-style slug but was made of hard fiber. In one penetration test described by Tozer, the concentrator itself hit the board in the center of the pattern and went right through a half-inch thick piece of deal (softwood) at 25 yards. At short ranges, I suspect the cup still held most of the shot charge and performed like a slug.

My favorite of all these methods was a rather bizarre contraption that used the principles expounded by British artillery officer Henry Shrapnel. In Shrapnel's 1803 invention that made his name a household word, smaller cannon

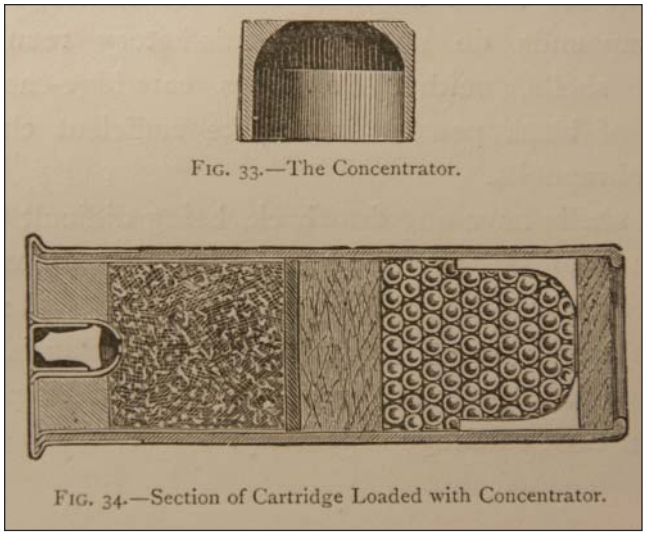


FIG. 33.—The Concentrator.

FIG. 34.—Section of Cartridge Loaded with Concentrator.

Charles Lancaster, the famous rifle-maker, developed and marketed a "concentrator" to hold the shot charge together. The fiber cup, when filled with pellets, became, in effect, a half-ounce slug at short ranges.

balls were enclosed in a larger, hollow one that burst in the air.

The sporting equivalent encased the charge of shot in an oval copper container, like an egg. It had two halves, the edges of which overlapped. There were two holes in the edges, and a piece of wire was passed through these to hold the halves together. Attached to the end of the wire was a fiber disk.

The wire and wad acted like a tail. As the vessel flew through the air, air resistance slowed the disk, which pulled out the wire, releasing the two halves and allowing the shot to scatter. The distance at which this took place was regulated by the length of the wire; if you wanted a solid slug, you simply crimped the wire over to keep it from pulling out at all.

According to Tozer, waterfowl were dispatched as far away as 120 yards using this method, and it was generally considered effective out to 170 yards. At those ranges, though, imagine how high you would have to hold to allow for drop!

Before the advent of choke, shooters were looking for ways to hold their shot charge together, while after the arrival of choke barrels, they immediately went in the other direction and began developing "spreader" loads to give a wide pattern from a tight barrel. From a handloading point of view, it's amazing the degree to which we can fine-tune a load, not just for pattern but for specialized performace such as this.

And one last piece of advice from "20-Bore" concerning the maintenance of gun locks: A drop or two of pure gin, administered with a feather, will suffice to preserve the "bents and scears." Finally, an explanation for that bottle of Gordon's that accompanied every safari. ●

AD INDEX

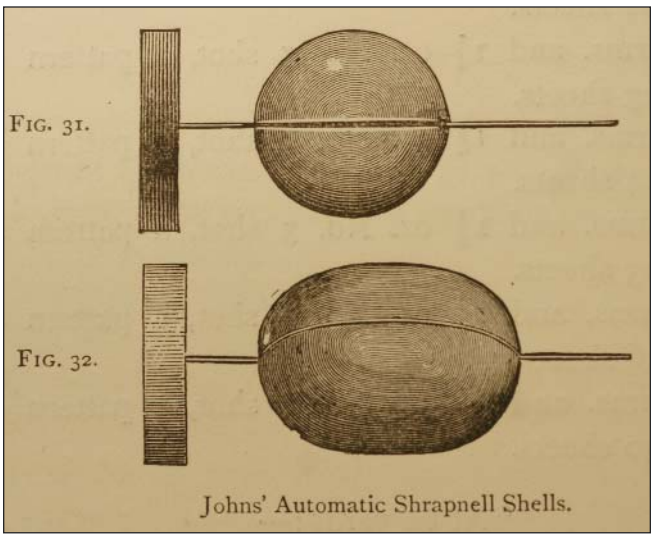
Strange and Wondrous Projectiles

IN RANGE by Terry Wieland

As Sir Randolph Nettleby pointed out in 1913, "When you take away the proper functions of an aristocracy, what can it do but play games too seriously?" Between about 1860 and 1914, that was precisely the position in which the English aristocracy found itself. Some of the "games" played too seriously included extended safaris in Africa and India, exploration of unknown climes, scientific invention and . . . wingshooting.

The annals of shooting in England in that period are rife with Lord This and the Earl of That. Beyond mere notoriety as "big shots," however, many of these men were the flower of the age – well educated, intellectual and curious, given to experimentation and study, and with both the time to indulge their interests and the necessary income to support them.

Since it was an age that worshipped learning, it's not surprising that many of these men either wrote and published books about their work or contributed to such wonderful anthologies as the Badminton Library series. Two of the most famous names, Lord Walsingham and Sir Ralph Payne-Gallwey, collaborated on the two Badminton volumes on wingshooting, and each was famous independently for work in various specialized fields related to wingshooting, guns, cartridges and related paraphernalia. Sir Ralph invented the "Payne-Gallwey" bronze bore brush – still the best, and still in production – and wrote a treatise called *High Pheasants in Theory and Practice*, which every wingshooter should read. It was first published in 1913 and has been in print ever since.



Mr. Johns, whoever he was, put a great deal of effort and money into developing and making his "Automatic Shrapnell [sic] Shells." With the coming of choke constrictions, such devices were rendered obsolete.

Lord Walsingham was noted primarily as one of the best shots in England but was also a noted entomologist with a vast butterfly collection. One day at his estate at Merton, he shot 842 driven grouse by himself for the express purpose of breaking a record of 728 set a few weeks earlier by Sir Frederick Milbank. Walsingham's motives were not the most admirable; Sir Frederick, on the other hand, was not out to set any records on August 20, 1872; he simply had an incredible day – and picked up his own birds between drives too.

Over the years the two men were asked about the specific loads they used, and both were quite forthcoming about the combinations of shot and black powder they found the best. This gives you some idea of how deeply involved British wingshooters were in the sport which, for many, was an all-consuming passion.

One of the more fascinating books to come out of that age, for those of us today who take an interest in the technical side, was published in 1887 by Basil Tozer, a sports-

(Continued on page 87)

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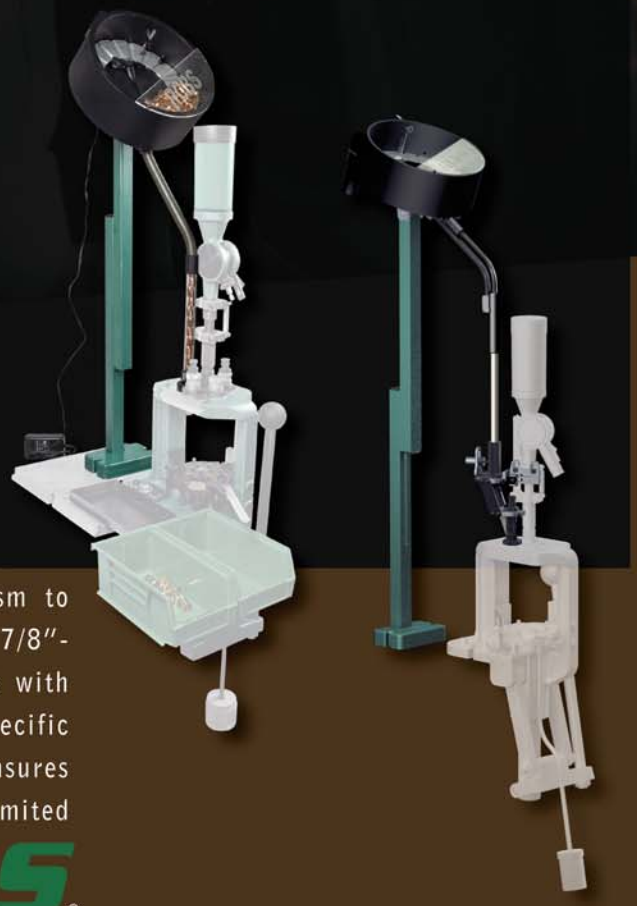

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